

HORTICULTURAL ABSTRACTS

Vol. XVI

June 1946

No. 2

Initialled reviews in the present number are by W. G. Keyworth and H. M. Tydeman of the East Malling Research Station, and by G. St. C. Feilden.

INDEX OF CONTENTS.

| | | Nos. | | Nos. | | |
|--|--|---------------------|-----------|--------------------------------------|--------------------|------------|
| MISCELLANEOUS | | Abstr. 84. Noted 11 | 571-655k | SMALL FRUITS, VINES AND NUTS | | |
| Historical and general | | | 571-587 | Abstr. 24. Noted 1 | 701-725a | |
| Physiology and chemistry of growth and nutrition | | | 588-607 | PLANT PROTECTION OF DECIDUOUS FRUITS | | |
| Growth substances | | | 608-617 | Abstr. 96. Noted 15 | 726-822o | |
| Soil problems | | | 618-631 | VEGETABLE, RUBBER AND OTHER PLANTS | | |
| Technique | | | 632-654 | Abstr. 141. Noted 18 | 823-964r | |
| Noted | | | 655a-655k | FLOWERS AND ORNAMENTALS | | |
| TREE FRUITS, DECIDUOUS | | Abstr. 44. Noted 1 | 656-700a | Abstr. 36. Noted 1 | 965-1001a | |
| General | | | 656-667 | CITRUS AND SUB-TROPICALS | | |
| Varieties | | | 668-671 | Abstr. 53. Noted 4 | 1002-1055d | |
| Propagation | | | 672-675 | TROPICAL CROPS | Abstr. 90. Noted 3 | 1056-1146c |
| Pollination | | | 676-679 | STORAGE | Abstr. 9. Noted 1 | 1147-1156a |
| Cultural practice | | | 680-695 | PROCESSING AND PLANT PRODUCTS | Abstr. 35. Noted 6 | 1157-1192f |
| Harvesting and marketing | | | 696-699 | NOTES ON BOOKS AND REPORTS | Abstr. 37. Noted 9 | 1193-1230i |
| Noted | | | 700a | Total Abstracts 649. Noted 70. | | |

MISCELLANEOUS.

Historical and General.

1. BROWNE, C. A. 57/58
Thomas Jefferson and the scientific trends of his time.
Chron. bot., 1944, 8: 363-423, bibl. 66.
 his study of Jefferson's relations to the scientific movements in his period, supported by extensive quotations from his writings, was published in celebration of the two hundredth anniversary of the birth of this extraordinarily versatile American President.

2. SPAFFORD, W. J. 634/635(942)
A review of South Australian rural industries.
J. Dep. Agric. S. Aust., 1943, 46: 287-96.
 his review by the Director of Agriculture includes a brief scussion of a number of vegetable and fruit crops. Flax and vegetable seeds are mentioned as war-stimulated crops of value in the peacetime economy of South Australia. The River Murray Irrigated Fruit Areas are described as partially productive and capable of development. Yield data of this district are given for 1940-41. It is estimated that the present area of 26,000 acres could be increased by 10,000 acres by extending irrigation. Vegetable growing on a large scale must be expected in the River Murray claimed Swamps.

3. LAUSANNE. 633/635(072)(494)
Stations fédérales d'essais agricoles, viticoles et arboricoles à Lausanne (Montagibert et Mont-Calme). (A note on the functions of the Swiss Federal Research Station at Lausanne.)
Publ. Stat. féd. Ess. agric. vitic. arboric. Lausanne, undated, pp. 8.
 there are three main sections: (1) viticulture and fruit growing, (2) agricultural chemistry, (3) seed production.

574. IGNATIUS, J. G. W. 634/635(492)
Overzicht van den nederlandschen tuinbouw bewerkt naar officiële gegevens. (A survey of Dutch horticulture, prepared from official information.)

Meded. TuinbVoorlichtDienst, 37, 1943, 42 pp., 1 map.

This survey opens with a table showing the areas devoted to various purposes, 4·6% of the surface being occupied by horticultural crops. Notes are given on the export of agricultural and horticultural products, the climate in relation to horticulture, and the different types of soil. The various sub-divisions of horticulture are then discussed, i.e. the cultivation of vegetables, of fruit trees, flower bulbs, trees and bushes (including rootstocks for fruit trees), flowers, and the production of seed. Tables are shown of the exports and imports of horticultural products for certain years from 1918 to 1939. An account is given of the organization of horticulture in Holland, with a list of officials and research workers. A map shows the distribution of the areas under horticulture.

575. BOOGAARD, J. L. 634/635(43)
De tuinbouw in Duitschland. (Horticulture in Germany.)
Meded. TuinbVoorlichtDienst [out of series], 1943, 92 pp., 2 maps.

As the title implies, this is a general survey of horticulture in Germany. There is a brief introduction dealing with, (1) the number of people employed in the various trades and professions—30·5% of the population were engaged in agriculture in 1925, in 1939 the figure was 27·3%, (2) the climate, particularly temperature and rainfall, (3) the use made of the ground (1·1% devoted to horticulture), and (4) German horticultural organization. The crops are then

taken in turn, with particulars of area under each crop, weight of crop per hectare, and the chief regions where cultivated. The imports and exports of the various horticultural products, including fruit tree rootstocks, are tabulated.

576. SUISSA, G., AND SOUTY, J. 634/635(42)
Notes on a tour of England in 1945. [French.]
Commun. Comité rég. Prune d'Ente Arbor. fruit., Agen, 5 Jan., 1946, pp. 27.

A report of the visit of French scientists to Covent Garden and to English horticultural research stations in August 1945.

577. PETERBURGSKI, A. 633/635(47)
At a conference of experts. [Russian.]
Sovhoznoe Proizvodstvo (State Farming), 1944, No. 12, pp. 42-3.

At a conference held at the Timirjazev Academy, the following were among the subjects discussed: (1) The extraction of an oil from the Zeravšansk juniper. The oil is obtained from what are called the "lapki" [literally "paws"—perhaps the tips of the branches] and is used in the healing of wounds. (2) The extraction of a balsam (a complete substitute for Canada balsam) from *Abies sibirica*, products of which contribute also to the synthetic manufacture of camphor. The balsam, like the juniper oil, heals wounds, in which it discourages the growth of anaerobic bacteria. (3) Studies at Tomsk of volatile plant oils fatal to bacteria. They are especially plentiful at the base of an onion or garlic bulb or clove about to sprout or just gathered. The oils are also present in the leaves and seeds of some plants. In the atmosphere above fields and woodlands they form an anti-bacterial zone. The peony, the larch, and the *Citrus* spp. are other members of the plant world to possess these volatile substances. Even tomato juice can be used for treating spruce inflammation. (4) The berries of *Schizandra chinensis*, from which a substance able to counteract the effects of exhaustion is prepared. The species is found by the sea, but can be grown in central Russia. (5) Nettle leaves. These contain vitamins A, C, and K and are richer in carotene than the carrot. They also contain nitrogenous compounds, 50-60% of which consists of proteins. Dilute alcoholic extractions of nettles stop bleeding. (6) A recommendation that *Euonymus* spp. should now be cultivated in the U.S.S.R. (7) The use of artificial lighting for tomatoes, cucumbers, strawberries all the year round, and the use of neon light to hasten the development and branching of young trees. By such means, 1-year-old trees may be at a level of development equal to that of 3-year-old trees grown in the usual way. (8) The use of an apparatus for detecting radio-active atoms by means of which it is possible to trace the path, and the rate of movement, and to detect the place of deposition, of certain chemical elements which, together with nutrient substances have entered a living organism. (9) The study of berry and small-fruit varieties. It has become important since the severe winters of 1939-40 and 1940-41. Phenological studies alone are not enough; the nature of the growth itself must be examined. (10) The yield of vegetable crops in relation to their utilization of sunlight. Because the assimilating surface is more rapidly developed by some plants than others, exact knowledge is essential on optimum dates for sowing and planting, rate of sowing, and spacing, in order to obtain maximum yields.

578. VIŠKEVIČ, V. I. 581.02(47)
The establishment of a laboratory of artificial climate at the Timirjazev Academy. [Russian.]
Proc. Sci. Conf. Timirjazev Agric. Acad. 3-10
June, 1944, 1945, No. 1, pp. 79-83.

Such a laboratory has not been established, but the requirements which it should satisfy are outlined; and the problems which could be solved by its aid are enumerated. A laboratory in which the illumination, temperature, moisture, and various other elements which determine the nature of

any particular climate can be varied at will should be of the greatest value in investigating plant physiology, soil and other conditions connected with agriculture.

579. ŠIŠKIN, B. K. 58(072)(47)
The Komarov Botanical Institute of the Academy of Sciences of the U.S.S.R. [Russian.]
Sovetsk. Botan., 1945, 13: 5-12.

The original purpose in 1713 of what is now the Botanical Institute of the U.S.S.R. was to grow medicinal plants. Among the activities which the Institute has pursued, and is pursuing now, since the enlargement of its scope, are investigations into applied botany, into wild plants and sources of raw material for industry, medicine, insecticides, fibres, and food. The publications mentioned in the article which deal with the practical aspects of botany are "Rubber-bearing plants of the U.S.S.R." edited by Ilijin, of which Vol. 1 has appeared, and "Plant raw materials in the field", in Series 5 of the Transactions of the Institute. The Museum of the Institute has the only collection in the U.S.S.R. of fruit, seed, timber, and various useful plant products. The introduction of decorative plants into the U.S.S.R. is another of its activities.

580. BAETGE, —. 634/635(43)
Die Versuchs- und Forschungsanstalt für Gartenbau in Berlin-Dahlem. (The Horticultural Experiment and Research Station at Berlin-Dahlem.)
Forschungsdienst, 1944, 17: 486-7.

The 120th anniversary of their foundation in 1824 was the occasion for reviewing the building up and constitution of the horticultural institutions in Berlin-Dahlem. A brief note may be of historical interest. The original foundation was a horticultural college (Höhere Gartenbauschule) from which later the research station developed. Both institutions became independent, though they had the director and certain members of staff in common. Since 1937 the Horticultural Experiment and Research Station (Versuchs- und Forschungsanstalt für Gartenbau) consisted of institutes dealing with the following subjects: (1) Horticultural plant breeding (including clonal rootstocks for fruit trees; Director Prof. Maurer, at the same time Director of the Research Station and the College). (2) Pomology (Director Prof. Kemmer). (3) Vegetable growing (at Grossbeeren near Berlin; Director Dr. Schuphan). (4) Utilization of fruit and vegetables. (5) Soil science. (6) Botany.

581. BIRJUZOV, I. 63: 551.566.3
Problems of agriculture in northern latitudes. [Russian.]
Sovhoznoe Proizvodstvo (State Farming), 1944, No. 2, p. 25.

Experience shows that before growing plants in the Far North the land must first be drained by deep ditches, and then peat, ashes, compost, lime, river and lake sand, turf, and artificial mixed with the soil. Where the ground is permanently frozen at a certain depth below the surface vegetables can be grown on ridges or narrow beds, which enable warmth and air to reach the roots. Potatoes must be vernalized. Special storage sheds have been built in which the temperature can be regulated, and which can be electrically illuminated. It was found that the most suitable temperature for vernalization was between 12° and 15° C. Vernalization carried out in the absence of light was slow. Potatoes must be planted early; the plants may recover from spring frosts but not, if the tubers are planted too late, from autumn frosts. No opportunity must be missed near the polar latitudes of shortening the growing period. By raising seedlings in pots made of peat and dung and transplanting them together with the pots, growth is not interrupted and the plants benefit by the manure of the pots. Contrary to popular belief, there are many insect pests in the north. The larvae of the cabbage fly have been successfully evaded by applying liquid manures and earthing-up

the plants outgrow the dangerous stage and develop new de roots to replace any of the primary roots which may have been damaged by the larvae.

32. VERDOORN, F. 575/577
On the aims and methods of biological history and biography with some notes for the collaborators of the *Index botanicorum*.

Chron. bot., 1944, 8: 427-48.

The author, managing editor of *Chronica Botanica*, is preparing a biographical encyclopaedia of plant scientists including all workers who have attained some standing by research, teaching, organizing work, etc., in agronomy, botany, horticulture (also owners of large horticultural establishments, especially if they have been responsible for new introductions or hybrids), forestry, microbiology, pharmacognosy, plant genetics and breeding, phytopathology and phytopalaeontology, as well as the principal botanical and horticultural collectors. Scientists everywhere are invited to co-operate.

3. BOYKO, H. 58(072)
On the need for an international network of plant-sociological stations.

Chron. bot. (Calendar), 1945, 9: 86-8.

For instance, for the valuation and classification of regions on the basis of their natural vegetation.

4. SIPČINSKII, N. V. 581.5
How to know more about exotics. [Russian.]

Priroda (Nature), 1944, No. 5-6, pp. 96-98.

1917, E. L. Wolf [Voljif] issued a book on the hardiness of trees and shrubs. He divided these into 5 classes according to hardiness, and sub-divided each class according to ability or inability on the part of its members to flower or bear fruit. Wolf is criticized for having failed to take account of several factors, other than those indicated above, according to which the hardiness of trees and shrubs should be assessed. Thus attention is drawn to the following missions: Young vigorous growth suffers from cold more than does the old, slowly-growing vegetation. Hardiness can be acquired after a period of years (e.g. *Corylus colurna*). Moisture, not want of hardiness, may be the limiting factor; weather conditions may be such that leaves are shed prematurely, or vegetation continued to a later date until autumn frosts terminate it. *Paulownia imperialis* Sieb. et Zucc. growing near Leningrad can last only a limited number of years by sending up annual shoots until it exhausts itself. No account is taken of the production of viable seed produced in sufficient amount to enable a species to propagate its kind and to compete with other species; individual specimens can be hardy yet unable to propagate. The author has drawn up a questionnaire for sending to all parts of the country where specimens of any particular tree or shrub are growing. The answers should supply the necessary information as to the hardiness and ability of acclimatization which a species exhibits.

5. CRANE, M. B. 634/635-1.521
The classification of horticultural plants. Varieties, synonyms and strains.

J. roy. hort. Soc., 1946, 71: 56-61, bibl. 17.

The usefulness of genetics in the classification of horticultural plants and hence in the elucidation of synonyms is illustrated by examples, some of them chosen from the author's work and that of his collaborators.

6. COOK, E. J. 581.9(68)
Preservation of the flora of South and South-West Africa.

Gdnrs' Chron., 1946, 119: 56-7.
Mountain and veld fires, drought, floods, soil erosion, etc., airport construction and farming are named among destructive causes threatening the survival of many rare plants in South and South-West Africa. The establishment of Botanic Gardens for the cultivation of native flora is,

therefore, strongly recommended in a paper read at a conference of the South African Institute of Parks Administration at Pietermaritzburg.

587. ILJIN, M. M. 551.453: 587.517
Nitraria and the origin of desert flora. [Russian.]

Priroda (Nature), 1944, No. 5-6, pp. 116-8.

Most of the article is concerned with the origin and migration of the genus, and the desert and coastal areas which the xerophytic plants usually occupy. It is mentioned, however, that the fruits are edible, and that the leaves yield both alkaloids and a very fast glue. Such useful properties encouraged investigation into the genus, with the result that a new species was discovered on the coast of the Caspian Sea. It has been called *Nitraria komarovii* Iljin and Lava, and is described as an elegant plant.

Physiology and chemistry of growth and nutrition.

588. WILLIAMS, R. F. 681.14
The physiology of plant growth with special reference to the concept of net assimilation rate.

Ann. Bot. Lond., 1946, 10: 41-72, bibl. 43.

Net assimilation rate is defined as the rate of increase in the dry weight of a plant per unit of active "growing material", and an attempt is made to evaluate leaf area, leaf weight, and leaf protein as indices of this "internal factor" for growth. Following a review of the literature, a growth experiment with *Phalaris tuberosa* L. is described. The experiment was limited to the vegetative phase of growth, and nutrient treatments comprised two levels of nitrogen and two of phosphorus in all combinations. Six harvests were taken at 14-day intervals. Tiller counts indicated that early meristematic activity was stimulated more by phosphorus than by nitrogen, and that the effect of nitrogen was delayed and was then greater at the higher level of phosphorus. These effects were reflected in the dry-weight data for total plant, leaves, and stems, but not in those for roots. Protein nitrogen data for the leaves indicated that phosphorus is directly concerned in protein synthesis.—In general, it may be said that leaf area and leaf weight are suitable indices of active "growing material" only during early vegetative growth, but that leaf protein is suitable for a considerably longer period, provided that nitrogen is in short supply. [From author's summary.]—Waite Agricultural Research Institute, University of Adelaide.

589. CHOLDNY, N. G. 581(477)
Twenty-five years of plant physiology in the Ukraine (25th anniversary of the Ukrainian Academy of Sciences). [Russian.]

J. Bot. U.R.S.S., 1945, 30: 3-13.

The author refers very briefly to the work done by Votčal, Ljubimenko, Lysenko, and other Ukrainian plant physiologists. He refers also to his own work, which includes some preliminary investigations into certain volatile plant substances which are withdrawn from the atmosphere and utilized by the protoplasm of various micro-organisms. It is suggested that among these substances there may be found vitamins as yet unidentified, which may prove useful in the cure of lung tuberculosis. His other work is on plant hormones. In this connexion he refers to a hormone in the endosperm of seeds, which spreads outwards as growth proceeds and is believed to affect the morphological development of the growing plant. Some confirmation of this belief has been recently provided by Armenian investigators, who introduced a hormone into leaves in their initial stage of formation and caused them to undergo various morphological changes. Choldny also mentions the treatment of seeds with hormones, noting that it has been successful in several experiments. In the discussion of work done by Lysenko there is a passing reference to the hormonal relationship of stock and scion, and to the artificial acceleration of the vernalization phase by means of ethylene chloride, chloroform, and other substances.

590. STILES, W. 581.12
Respiration. II.
Bot. Rev., 1946, 12: 165-204, bibl. 76.
 This is a supplement to an article published in 1935 (*Bot. Rev.*, 1: 249-68). The last ten years has been an active period for work on the respiration of plants. Particular attention has been directed to the mechanism of the respiratory processes, and much evidence has accumulated indicating the relationship between various oxidizing systems and the respiratory activity of plants of different species.

591. KRAMER, P. J. 581.11
Absorption of water through suberized roots of trees.
Plant Physiol., 1946, 21: 37-41.
 It was shown that shortleaf pine, dogwood and yellow poplar absorb water through suberized roots and it is suggested that water absorption through mature, suberized roots plays a vital role in evergreen trees during the winter, when root growth is slowest, and is of some importance to deciduous trees in summer immediately following a drought, during which the roots have become suberized to their tips. The rate of water absorption was found to differ greatly in the 3 species.—Duke University, Durham, North Carolina.

592. ADDOMS, R. M. 581.11
Entrance of water into suberized roots of trees.
Plant Physiol., 1946, 21: 109-11, bibl. 5.
 It is shown that the difference in the rate of water absorption by suberized roots of shortleaf pine and yellow poplar, described by Kramer (see previous abstract) is partly related to such anatomical characteristics of the bark of the roots as the number of lenticels and the completeness of the coverage by periderm of the inner portion of the bark.—Duke University, Durham, North Carolina.

593. SHIRLEY, H. L. 612.014.44
Light as an ecological factor and its measurement. II.
Bot. Rev., 1945, 11: 497-532, bibl. 186.
 This article is a supplement to one which appeared *ibid.*, 1935, 1: 355-82. The trend of research on light as an ecological factor during the last ten years is shown in the introduction. Refinement in knowledge and new scientific discoveries follow closely behind the introduction of new scientific instruments and new scientific technique. And in no phase of botany has this been more evident than in the general field of plants in relation to light. Of outstanding importance has been the general availability of cheap, reliable light-measuring devices that use as their sensitive element the photoelectric cell. Equally important have been the advances made in growing plants in controlled environment through the use of newly developed artificial sources of light, particularly neon and sodium vapour lamps and the filters which transmit definite ranges of wave lengths. As a result, recent workers have been able to surpass their predecessors in the accuracy of light measurement and in the precision of light control. And through advances by Professor R. A. Fisher and his American disciples they have learned how to analyse the separate and combined effects of varying several factors simultaneously in the same experiment. All three of these developments appeared before 1935 but had not yet been put to widespread use in botanical research. The results obtained are discussed under the headings: light measurement, light climate, light requirements for photosynthesis, interrelationships between light and other factors, light and succession.

594. ČAĬLACHJAN, M. H. 612.014.44: 581.144.4
Photoperiodism of individual parts of the leaf, its halves.
C.R. Acad. Sci. U.R.S.S., 1945, 47: 220-4, bibl. 11.
 The relative susceptibility to photoperiodic action of individual parts of a leaf under a differential light regime within a single leaf blade was tested in the short-day plant

Perilla *nankinensis* and in the long-day spinach variety Vitoik. In the middle of July the plants were trimmed in the following manner: all the leaves and shoots, except the apical bud and a single fully developed leaf at the fifth node (from the base) were removed in *Perilla*; in spinach rosettes the biggest leaf only of the growing cone in the centre was left. There were 8 basic and 3 additional sliding variants in the *Perilla* trials and 5 basic variants in the spinach trials. The basic variants were: (1) Entire leaf long day (L); (2) entire leaf short day (S); (3) base short apex long day (L); (4) base long, apex short day (S) (L); (5) left half long, right half short day (L/S); (6) base short day, apex in continuous darkness (D); (7) base in darkness (S) apex short day (S); (8) left half in darkness, right half (D) short day (D/S).—In *Perilla* the transition of the shoot reproductive development was only slightly retarded by the (L/S) and (L) variants, whereas (S) caused a considerable (S) delay. In this case, the base of the leaf (long day zone) appears to act as a barrier to the photoperiodic influence from the apex (short day) to the shoot. Correspondingly (L) caused a sharp time lag in spinach, as against (S) (L) and S/L. In contrast to the long-day zone, darkness of the base (S) was found not to hinder the transmission of the (D) photoperiodic effect in *Perilla*. Some further conclusions are drawn from the results obtained in the experiments with sliding variants (L+S; L/S+S/L; D+S; D/S+S/D). The (S) method should prove productive of further results. Erevan State University and Inst. of Plant Physiology of the Academy of Sciences of the U.S.S.R.

595. ČAĬLACHJAN, M. H., AND MEGRABJAN, A. A. 612.014.44: 631.847
Effect of day-length upon the formation of root nodules on the roots of leguminous plants.
C.R. Acad. Sci. U.R.S.S., 1945, 47: 439-43, bibl. 9.
 Beans (*Phaseolus vulgaris*) and soya beans were used short day plants and *Ersva vicia*, *Vicia sativa* and *Phaseolus aureus* as long day plants. Root nodule development was found to be intensified with long day conditions irrespective of the photoperiodic reaction of the plant. In all species under observation the rate of root nodule formation was related to the rates of growth and of dry matter accumulation. Another internal factor favouring infection with root nodule bacteria is apparently the high content of growth hormone occurring under long-day conditions.—The Armenian Agricultural Institute, Erevan.

596. ČAĬLACHJAN, M. H. 612.014.44
On the correlation between the reaction of flowering to the nitrogenous food and the photoperiodic reaction of the plant.
C.R. Acad. Sci. U.R.S.S., 1945, 48: 360-4, bibl. 7.
 These experiments, undertaken in continuation of previous work by the author (see *ibidem*, 1945, 47: 146-9; 1946, 16: 14), present further evidence of the correlation between nitrogen nutrition and photoperiodic reaction in plants. An explanation of the phenomenon from the evolution point of view is attempted.

597. KURSANOV, A. L., AND KRJUKOVA, N. N. 612.014.44
The influence of geographical factors on the activity of peroxidase in plants. [Russian.]
Biohimija (Biochemistry), 1945, 10: 2: 97-103.
 Willstätter's method of determining the intensity of peroxidase activity was applied to a study of the bark of *Salix* and *Betula* spp., and the needles of *Juniperus*, *Abies*, *Picea*

nus, and *Larix* spp. Specimens of these genera were investigated in many widely scattered localities, even so remote from one another as Murmansk and Tbilisi. The activity of the enzyme increased from southern to northern latitudes, and from low to high altitudes; but though such phenomenon was never wholly eliminated it became less pronounced when trees from many different regions were grown for some years under identical conditions. It is believed to have no relationship with photoperiodism. The increased rate of oxidation in the cold latitudes and high altitudes is the result of intense respiration, which is the action of the trees to the unfavourable conditions in which they find themselves.

8. RICHTER, A. A., AND KRASNOSSELSKAYA, T. A. 581.148

A contribution to the knowledge of the breaking of winter dormancy in buds of woody plants.

C.R. Acad. Sci. U.R.S.S., 1945, 47: 218-9, bibl. 1.

me and ash trees, which show very pronounced dormancy under Moscow winter conditions and remained unaffected by room temperatures of 15-17°, were selected for the experiments. The dormancy of two buds was broken by Golisch's warm water bath method and their tissues were found to a structureless pulp in a mortar with 2 c.c. water. Two to three drops of the pulp were introduced under the bark of a dormant branch incised with a T cut. Five to seven days after treatment the buds showed clear signs of swelling followed by unfolding of the leaves, while the controls—both operated and treated with water, and non-operated—remained completely dormant. The results confirm the authors' hypothesis put forward in an earlier paper (*ibidem*, 1942, 35: 184-6; *H.A.*, 13: 356) that in woody plants the breaking of dormancy is induced by stimulating agents of the hormone type.

9. HOLUBINSKY, I. N. 581.162.3

Studies on the physiology of pollen germination.

I. Mutual stimulation in the germination of pollen grains.

C.R. Acad. Sci. U.R.S.S., 1945, 48: 62-3, bibl. 4.

15 plant species from different families including hops, mato, sunflower, etc., a clear correlation was found to exist between the amount of pollen in a drop of sugar solution and both the germination percentage and the length of pollen tubes, the majority of species showing a sharp increase in both values with increased density.—Kranian Station of Hop Research, Zhitomir.

0. JEFFREY, E. C. 581.162.3

Chiasmoty or the doctrine of delayed action fertilization.

Science, 1945, 102: 653-6, bibl. 3.

a discussion of *Erythronium americanum* and other plant aerial the conclusion is reached that the old view, according to which fertilization takes place at the time of the union of gametes, is correct, and that the hypothesis of true sexual union normally taking place long after the junction of gametes has no sound basis in fact.

1. ČAİLACHJAN, M. H., AND MEGRABJAN, A. A. 631.847

Effect of soluble nitrogenous compounds upon formation of nodules or roots of leguminous plants.

C.R. Acad. Sci. U.R.S.S., 1945, 48: 138-41, bibl. 9.

peas and *Ervum vicia* plants were grown in so-called 2-storey culture, i.e. the upper root portion in a flower pot, the lower portion in an aqueous solution in a glass jar. Thus was possible to vary the nutrient mixtures, in this case nitrogen and no nitrogen, in the two zones independently of each other and to study their effect on root nodule formation. The conclusion drawn from the tabulated results is that the development of root nodule bacteria is determined by the nitrogen content in the tissues rather

than by the soluble nitrogen content of the medium in which the root grows.—Armenian Agricultural Institute, Erevan.

602. RAKITIN, J. V.

581.145

Relation between seeds and pericarp in the process of fruit growth in ripening.

C.R. Acad. Sci. U.R.S.S., 1945, 47: 590-2, bibl. 8.

As fleshy, coloured fruits have the function of attracting birds for the purpose of seed distribution, the pericarp must not develop too far before the seeds have formed a protective coat. The author studied the relation between seed and pericarp development in the tomato fruit and showed that the formation of mucus in the tissues surrounding the seeds, which is the first index of ripening, does not occur until the seeds have attained physiological maturity. A table indicates the changes in fruit coloration and in the condition of tissues surrounding the seeds as the fruit matures, together with the changes in acetaldehyde content and peroxidase activity in fruit samples taken at 5 successive stages from the periphery and from the middle.—Timiriazev Institute of Plant Pathology.

603. VLADIMIROV, A. V.

581.192: 631.8

Effect of potassium and magnesium sulfates and chlorides upon the formation of oxidized and reduced organic compounds in plants.

Soil Sci., 1945, 60: 377-85, bibl. 9.

Organic acids in tobacco leaves and caoutchouc in kok saghyz serve as examples of oxidized and reduced organic compounds respectively. Potassium was found to have opposite effects upon the metabolism of organic acids according to whether nitrogen was supplied as nitrate or ammonium. In the case of nitrate nutrition, which favours oxidation, it stimulates the reduction processes, causing the organic acid content in the leaves to fall, whereas in the case of ammonium nutrition which stimulates reduction, the organic acid content rises with increased dosages of potassium. Similar observations on the effect of potassium on oxidation and reduction processes were made in kok saghyz, with the difference that the valuable product, caoutchouc, is a reduced compound which accumulates under conditions opposite to those in which organic acids accumulate in tobacco leaves. Chloride nutrition, in contrast to sulphate nutrition was shown to raise the citric acid content in tobacco leaves, while sulphates favoured caoutchouc yield in kok saghyz. Also magnesium was found to have a beneficial effect on the storage of caoutchouc. The author concludes: "It is assumed that the use of ammonium salts together with potassium and magnesium sulfates would increase not only the caoutchouc content of kok-saghyz but also the content of other reduced products in plants, particularly volatile oils in essential-oil plants and pyrethrins in the Dalmatian daisy. On the other hand, the use of nitrate nitrogen together with potassium and sodium chlorides should increase the content not only of citric and malic acids but also of other valuable organic acids, particularly ascorbic acid (vitamin C). The latter hypothesis may prove of significance in the choice of nitrogenous and potassium fertilizers to be used for the cultivation of vegetables, fruit, and berries."—Gedroiz Research Institute of Fertilizers, Agrotechnology and Soil Science.

604. BENNE, E. J., ROSE, D. I., AND COMAR, C. L.

581.192

Report on chlorophyll in plant tissue.

J. Ass. off. agric. Chem. Wash., 1944, 27: 517-26, bibl. 8, being *J. Art. East Lansing agric. Exp. Stat.* 664.

In the authors' view, the photoelectric, colorimetric method and the spectrophotometric method are the best available for analysing plant tissue for total chlorophyll and the percentages of the a and b components respectively. Both methods are described in detail.

605. BENNE, E. J., AND SNYDER, A. J. 581.192: 546.72

Report on iron in plants.

J. Ass. off. agric. Chem. Wash., 1944, 27: 526-31, bibl. 3.

It is recommended that the study of the *o*-phenanthroline procedure for the colorimetric, and the titanous chloride method for the titrimetric, evaluation of iron be continued with the view to adopting them as official methods. [From authors' summary.]

606. RANGNEKAR, Y. B. 546.711: 577.16

Role of manganese in the formation of vitamin C and carotene in plants.

Cur. Sci., 1945, 14: 325, bibl. 13.

An investigation was carried out by the author on *Amaranthus gangeticus*, grown in pot-cultures with local soil low in available manganese. The results are given for control and four treatments of manganese applied as manganese sulphate at the rates of 0.05, 0.1, 0.2 and 0.3 g. per pot (6 lb.). Estimations were made of the vitamin C, carotene, and manganese in the leaves. The formation of carotene seemed to have been uninfluenced by the treatment while that of vitamin C was affected in various degrees by the added manganese, a significant point being that it was encouraged up to a certain concentration of added manganese, beyond which additional concentrations become increasingly harmful.

607. BOBKOV, E. V., AND PRIADILSHCHIKOVA, T. D. 581.192: 546.27

On the solubility of boron compounds in the plant.

C.R. Acad. Sci. U.R.S.S., 1945, 48: 358-9.

When plant materials are extracted with hot water by the method of periodic extraction, most of the boron contained in the plant passes into solution. Under these conditions, however, from one-fifth to one-tenth of the boron cannot be transferred to the solution. The chief mineral elements in the plants can be placed as follows in descending order of solubility in hot water: phosphorus, calcium, boron, potassium. [Authors' conclusions.]

Growth substances.*

608. WENT, F. W. 577.15.04

Auxin, the plant-growth hormone. II.

Bot. Rev., 1945, 11: 487-96, bibl. 94.

This is a continuation of an article *ibid.*, 1935, 1: 162-82 and reviews the literature on auxins for the last ten years, during which period more than 500 papers on the subject have appeared. The main points are:—The *Avena* method is still the principal method of quantitative analysis of auxin. Chemical isolation and identification of indoleacetic acid from vascular plants has been accomplished. Production of auxin as a function of the growing condition of the plant has been extensively investigated, and very clear correlations between growth rate of shoots during their grand period of growth and auxin production by the stem tip have been found. Auxin transport was confirmed as polar inside all living tissues, except when pharmacological doses were applied. The assumption that auxin is a co-enzyme required for some process essential in growth was greatly strengthened. Only at extremely low concentrations is root growth accelerated by auxin, but above 10^{-10} molar it is inhibited. Auxin coming from the growing stem tip is the correlation carrier which prevents development of lateral buds. Initiation of roots on stems is caused by auxins; this discovery has led to one of the most important practical applications of auxins, the rooting of cuttings with auxins and auxin-like substances. Much work has been done on the anatomical changes in tissues caused by application of auxin. Auxin treatment of unfertilized ovaries or styles of many plants led to the development of

* See also 969, 971-974, 977.

parthenocarpic fruits of normal size. Application of auxins to stems causes cambial activity over some distance below the point of application. Auxins applied at a later stage in fruit development may check fruit drop, a fact utilized commercially with some apple varieties to prevent pre-harvest drop. In many plants structures closely resembling crown gall can be induced by auxins. Addition of auxins to the nutrient solution may partly overcome zinc and boron deficiencies.

609. THOMSON, B. F. 577.15.04: 581.14

Tissue responses to physiologically active substances.

Bot. Rev., 1945, 11: 593-610, bibl. 66.

The most consistent response of plant tissues to treatment with relatively high concentrations of physiologically active substances (e.g. growth substances) is cellular proliferation. The specific tissues which respond and the nature and degree of the response vary with both the species and the substance applied. Treatment of tissues which are already proliferating, such as meristems, usually causes either inhibition of growth or a distortion of the normal growth pattern. Crown-gall infection causes abnormal growth resembling that induced by synthetic auxins. The action of auxins in the tissue responses here discussed has been interpreted as a mobilization of solid matter toward the site of treatment. [From author's conclusion.]

610. GUSTAFSON, F. G. 577.15.04: 581.192

Influence of external and internal factors on growth hormone in green plants.

Plant Physiol., 1946, 21: 49-62, bibl. 18, being *Pap. Dep. Bot. Mich. Univ.* 746.

It has been found that poor mineral nutritive conditions, low temperature, and high light intensities lower the growth hormone content in plants investigated (tomatoes and maize). Stems of *Helianthus annuus* and *Impatiens balsamea* parasitized by *Cuscuta polygonorum* have a higher growth hormone content than stems not so parasitized. As a part of a plant, or the plant as a whole, ages, its growth hormone content becomes less. Flower buds formed first in an inflorescence of the tomato have more hormone and are more likely to set fruits than those formed later. [From author's summary.]

611. SUKHOGRUKOV, K., AND STROGONOV, B. 577.15.04: 632.3

On the growth hormones in a diseased plant.

C.R. Acad. Sci. U.R.S.S., 1945, 47: 593-6, bibl. 10.

From experiments with oats and potatoes it is concluded that in diseased plants the auxins are destroyed in the case of protective necroses, while no auxins are formed in dead cells. Parasitic organisms which disturb the correlation between the growth processes (*B. tumefaciens*) are capable of producing and secreting auxins and cell division hormones.

612. BOBKOV, E. V., AND YAKUSHKINA, N. I. 577.15.04

A gravimetric method for determining the activity of growth substances.

C.R. Acad. Sci. U.R.S.S., 1945, 48: 132-4, bibl. 7.

It is claimed that the activity of growth substances can be accurately determined by a simple method. Fragments of pea stems are placed for a certain time in a solution of a substance to be tested. The increment in weight in comparison with the control (tap water) expressed as per cent, the initial weight serves as a measure of activity. The effect of concentration of heteroauxin on water intake of sections of peas was determined and the results are tabulated.

613. BLAGOVESHCHENSKY, A. V., AND KOLOGRIVOVA, A. J. 581.144.2: 577.15.04

Growth of roots as stimulated by certain organic acids.

C.R. Acad. Sci. U.R.S.S., 1945, 48: 440-3, bibl. 4.

The growth of rootlets of germinating seeds of *Phaseolus aureus* was stimulated by soaking the seed in solutions

uccinic acid (M/3000) and aspartic acid (M/6000).—Central Asia State University, Tashkent.

14. VAN DER LEK, H. A. A., AND KRIJTHE, J.

577.15.04: 631.535

Over de groeistoffen en hare toepassing in den tuinbouw, in het bijzonder bij het stekken. (Growth substances and their application in horticulture particularly with regard to cuttings.)

Meded. Tuinb. Voorlicht. Dienst, 25, 1943, 119 pp.

his is a more general review (see below, No. 615) of growth substances and their application to horticultural experiments and practice. The authors discuss the natural growth substances (auxins, hormones) and their function in plant development, their artificial synthesis, the technique of their application to plant cuttings (the absorption and the powder methods) and give examples of their use. Their own work is illustrated by 28 figures from photographs, and descriptions of experiments carried out on beans, *Ilex verticillata*, *Poinsettia pulcherrima*, *Bougainvillea glabra* and *B. formosa*, *Ibicum tomentosum*, carnations, *Taxus baccata*, *Hedera murensis*, *Cotoneaster salicifolia*, *Chamaecyparis lawsoniana*, apple seedlings and myrobalan cuttings. The paper concludes with a list, in tabular form, of plants on which the growth substances have been used by various workers, giving the substance used, its concentration and length of time of application, the percentage rooting, and notes on results.

15. VAN DER LEK, H. A. A. 577.15.04

Toepassing van groeistoffen in land- en tuinbouw. (The application of growth substances in agriculture and horticulture.)

Landbouwk. Tijdschr., 1943, 55: 484-517, bibl. 30.

This is a review of the use of growth substances in plant physiological experiments. Reference is made to some of the author's experiments which showed:—a better take in grafting the grape-vine after treating both cut surfaces with a solution of β -indolylacetic acid and also by painting round the union with the solution; rooting in cuttings of *Euphorbia fulgens* by 0.2% indolylbutyric acid in a powder form mixed with powdered charcoal, and in cuttings of lilac by 2% of the potassium salt of indolylacetic acid with powdered talc.

16. KRIJTHE, E., AND VAN DER LEK, H. A. A.

631.535: 577.15.04

Over de poedermethode ter toediening van groeistoffen aan stekken. (On the dust method of applying growth substances to cuttings.)

Overdr. Lab. Tuinb. Inst. Onderz. Verw. Fruit Groenten Wageningen No. 25, 1940, 7 pp., reprinted from *Floralia*, 1940, Nos. 24, 25 and 26.

he authors' experiments show that the dust method of applying growth substances (e.g. mixed with powdered charcoal) can be used with success on certain plants, particularly latex-producing plants. Illustrations and tables of figures show the good results obtained with *Euphorbia fulgens* and *Poinsettia pulcherrima*.

17. NEWTON, L. 582.6

Agar-agar and its supply.

Endeavour, 1945, 4: 69-74, bibl. 12.

survey of the sources of agar-agar in Britain and elsewhere and of the manifold uses to which the material is put. here is some indication of the presence in agar of certain growth-promoting substances.

Soil problems.

18. SLATER, C. S., AND BRYANT, J. C. 631.432

Comparison of four methods of soil moisture measurement.

Soil Sci., 1945, 61: 131-55, bibl. 21. Comparisons have been made under field conditions of the

behaviour of three types of moisture-measuring instruments: tensiometers, resistance blocks and gravimetric plugs. The performances of the instruments were judged by moisture determinations on soil samples taken at random within a restricted area around each instrument installation. The three instruments differed with respect to the accuracy with which they measured soil moisture, the ranges of moisture in which the instruments were sensitive, and their efficiencies in differentiating soil moisture levels. On a silt loam soil the plugs and blocks were superior to the tensiometers with respect to errors of estimate and range of operation, but were insensitive to moisture changes in a range of higher moisture contents where the tensiometers gave their best performance. On a silt loam soil the plugs were better than the blocks with respect to errors of estimate, efficiencies of differentiation, and location of their sensitive ranges on an available moisture scale. On a very sandy soil the blocks appeared to be better than the plugs in all respects, although the performance of neither instrument was satisfactory throughout the available moisture range. The results of the experiments as a whole indicate clearly that no one instrument is "best" in its present state of development. [From authors' summary.]

619. HOON, R. C., AND PATHAK, A. D. 631.42

Conductometric method of analysis as applied to soil survey work. III. The estimation of the soluble sulphate and chloride contents of soils.

Ind. J. agric. Sci., 1945, 15: 50-2.

A technique of conductometric titration of sulphates and chlorides in the water extracts of soils based on the use of the Dionic Water Tester equipment is described. The method is extremely simple and the outstanding advantage is that it does not require the use of any electric mains, battery, etc., and therefore can be used both in the laboratory and the field. [Authors' summary.]

620. HUNTER, A. S., AND KELLEY, O. J. 631.432

Changes in construction of soil moisture tensiometers for field use.

Soil Sci., 1946, 61: 215-7.

Details are described and figured of changes in construction of the soil moisture tensiometer, which permit laying the top portion over to the ground, thus enabling cultivating implements to pass over it.

621. DONNELLY, M. 631.459

The Wollny effect.

Calif. Citrogr., 1946, 31: 89.

Wollny, a German soil physicist, appears to have been the first scientist to note the increase in percentage of runoff from bare cultivated soil in contrast to that from soil covered by a close-growing crop. The data accumulated in recent years in terms of accelerated runoff and accelerated removal form a framework that will correlate the principal cause and consequences of those types of soil treatment that lead to decline in productivity and to soil erosion. This framework is here referred to as the Wollny effect—the effect of cultivation on surface soil, and the formation of a "skin" of dispersed soil particles. The principal cause of the Wollny effect is the development of a superficial layer, usually thin, in which the percentage of voids larger than those of capillary size is appreciably less than in the unaffected soil. This layer, the Wollny layer, is produced by the processes of dispersion (by rain, running water, tillage, etc.) of soil particles, and soil compaction (sedimentation, mechanical pressure, etc.), the two frequently operating concurrently. The chief consequences of the Wollny layer are (1) decrease in the rate at which water will enter the soil, (2) decrease in the rate of movement of air in and out of the soil, (3) inhibition of seed germination, and (4) reduction in the rate of growth of young seedlings of some plants.

622. PARKER, E. R., AND JENNY, H. 631.432
 Water infiltration and related soil properties as affected by cultivation and organic fertilization.
Soil Sci., 1945, 60: 353-76, bibl. 9, being *Pap. Calif. Citrus Exp. Stat.* 533.

Rates of infiltration of irrigation water into Ramona loam soil of an experimental orchard of the University of California Citrus Experiment Station, Riverside, California, were found to vary widely according to fertilizer treatments. Incorporation of organic matter as cover crop or manure greatly increased the rate of water infiltration over that of plots which received only urea as a fertilizer. The improvement was related to the quantity of organic matter applied. Winter cover crops were slightly superior to dairy manure applied in amounts to supply 1 lb. of nitrogen per tree annually. Compared with the soils of a dry-farmed area adjacent to the orange grove, the soils of the orchard are characterized by lower rates of infiltration and by greater compaction, especially at a depth of 6 to 12 inches. It is suggested that these effects are largely the result of cultivation practices and of traffic in the orchard. The hypothesis that soil compaction is influenced by traffic and cultivation was tested by subjecting both dry and wet plots of the dry-farmed area to intensive traffic by a track-type tractor and to repeated disking. The effects of the tractor were very detrimental to water infiltration in both dry and wet soil. Elimination of all cultivation on these plots, in conjunction with the growing of annual cover crops, the above-ground portions of which were removed, produced marked improvement in water penetration during a period of 8 years. [From authors' summary.]

623. WALSH, T., AND CULLINAN, S. J. 631.416.4
 The effect of wetting and drying on potash-fixation in soils.
Emp. J. exp. Agric., 1945, 13: 203-12, bibl. 11.

Potassium was fixed as a result of alternately wetting and drying some soils. This fixation was not permanent but was of sufficient magnitude to induce severe potash-deficiency symptoms in a first crop of mustard. This was accompanied by an appreciable decrease in yield and in potassium uptake. The ultimate effect of the treatment, as reflected in the growth and composition of a second crop of mustard, was a liberation of potassium from the fixed state. Potash-release was shown by a determination of the total exchangeable quantity of this element, using sodium sulphate as a displacing agent. Potassium fixation appears to be particularly a characteristic of certain limestone-derived soils. Although the initial rendering unavailable of added potassium through fixation is undesirable where the immediate needs of a crop are concerned, the ultimate effect may be good, being conducive to the building up of a reserve of potash in the soil. Some observations on the ability of plants to use the less readily available forms of potash in the soil are recorded. [From authors' summary.]

624. STEWART, E. H., AND VOLK, N. J. 631.416.4
 Relation between potash in soils and that extracted by plants.
Soil Sci., 1945, 61: 125-9, bibl. 7.

This study was undertaken for the purpose of determining the relation between several forms of potassium in soils and the amounts of potassium extractable from the soils by continuous cropping under greenhouse conditions.

625. KURTZ, T., DETURK, E. E., AND BRAY, R. H. 631.416.2
 Phosphate adsorption by Illinois soils.
Soil Sci., 1946, 61: 111-24, bibl. 16.

This paper reports an investigation into the nature of the reactions responsible for the removal of phosphate ions from solution by soils. The general procedure was to bring samples of the soil into contact with solutions of known phosphate concentrations and to determine the decreases in the amounts of phosphate in solution after definite periods of time.

626. DAS, S. 631.85: 631.417
 The combined action of organic matter and phosphatic fertilizers in soils.
Ind. J. agric. Sci., 1945, 15: 42-7, bibl. 14.

Organic phosphorus complexes are formed in the soil by combined action of decaying organic matter and phosphatic fertilizers. The beneficial action of these colloidal phosphates is explained on the basis of certain hypotheses mentioned in the paper, according to which colloidal substances can serve as plant foods and the direct dissolution of plant food is rendered possible to the cell sap of root hairs. [From author's summary.]

627. JARUSOV, S. S. 631.82 + 631.811.6
 The importance of absorption capacity of various soils in relation to Ca and Mg by the use of pure, and magnesium-containing, calcium fertilizers for liming. [Russian.]
Proc. Lenin Acad. agric. Sci., U.S.S.R., 1943, No. 3, pp. 41-2.

Data show that the application of magnesium limestone has a greater influence on soils rich in organic substances than on soils poor in organic matter. It follows that the composition of the lime fertilizer applied should depend on organic content of the soil.

628. STEPHENSON, R. E., AND SCHUSTER, C. E. 631.4: 631.87
 Straw mulch for soil improvement.
Soil Sci., 1946, 61: 219-24, bibl. 6.

Growth of sunflower as an indicator plant in soil taken from the top 2 inches under a straw mulch was appreciable greater than in soil taken from sod or a scraped plot. The straw-mulched soil maintained its lead in promoting plant growth, after liberal fertilization of all the soils to correct nutrient deficiencies. The straw-mulched soil contained the most acid-soluble potassium, was richest in humus, and had much the highest proportion of aggregates larger than 1.0 mm. in diameter. [Authors' summary.]

629. BEATER, B. E. 631.85
 The value of preliming, primarily as a means of improving the absorption of phosphorus by plants.
Soil Sci., 1945, 60: 337-52, bibl. 55.

The experiments were carried out on representative soils of the sugar belt of Natal and Zululand, tomatoes being used as indicator plants for phosphate deficiency.—Experimental Station of the South African Sugar Association, Mount Edgecombe, Natal.

630. ANON. 631.459
 Erosión y conservación de suelos. (Erosion and conservation of soils.)
Rev. Agric., Puerto Rico, 1944, 35: 103-20.

This is an extended summary in Spanish of "The Rape of the Earth: a World Survey of Soil Erosion" by G. V. Jackson and R. O. Whyte (H.A., 10: 1543). It follows the lines of the original but has 3 illustrations, not found in the book, showing terraces in La Plata, contour cultivation of tobacco at Caguas, and an experiment with various kinds of plants and of banks with different slopes on "The plateau."

631. BENNETT, H. H. 631.459(68)
 Soil erosion and land use in South Africa.
Citrus Gr., 1945, No. 141, pp. 12-5.

General suggestions are presented as to some of the more obvious remedial needs for lessening erosion damage. It is stated that what is very much needed now in South Africa is a very active, nation-wide programme of erosion control based on two fundamental concepts, viz. (a) treatment of the different kinds of land occurring on each farm; (b) co-operation with farmers through technical assistance supplied by the Government's soil-conservation agents through work groups of experienced men. The means

aining this end are discussed under (1) a national programme of anti-erosion operations, (2) government and farmer contributions, (3) available tools for anti-erosion work. Under (3) are mentioned (a) contouring practices, strip-cropping, (c) crop rotation, (d) addition of humus, use of lime, phosphorus, etc., (f) use of wind-breaks, limitations in the use of land, (h) controlled waterways, donga control, (j) veld management, (k) mountain management, (l) research, (m) education.

Technique.

2. DE VALLIÈRE, H. 631.544
Les hélios-séries. (Helio hot houses.)

Rev. hort. suisse, 1943, 17: 25-7.

brief note without technical detail of the apparently quite successful attempts to use the sun's rays as a permanent and steady source of heat for hothouses at Tashkent in Turkestan. The acquisition and—presumably—retention of heat would appear to depend on observing absolutely exact measurements in the placing of the high quality glass used, on the use of special putty which will stand unchanged extremes of heat and cold, on nice calculations with regard to the expansion of metals and on carefully planned ventilation systems. These means it has been possible to prevent the temperature ever falling more than 1 degree below zero even with outside temperature of -17°C . On the day on which it fell to -1°C . between 3 and 8 a.m. the thermometer registered 15° to 30°C . as from 9 a.m. The possibilities are immense and a more detailed account would be very welcome.

3. BROWN, C. A. C., AND GOLDING, E. W. 631.544: 631.588.1

Electric soil warming in frames.

Agriculture, 1946, 52: 557-61.

During the early years of the war the Electrical Research Association carried out extensive experiments on electric soil warming under actual growing conditions in widely scattered districts. The present article is a summary of the *Technical Report Ref. W/T7* [see *H.A.*, 12, 143] published by the authors in 1942.

4. USINES OMEGA, S. A. 631.544

Serres, châssis et autre matériel horticole. (Greenhouses, frames and similar material.)

Rev. hort. suisse, 1943, 16: 13-8.

brief, interesting account by one of the largest glasshouse manufacturers in Switzerland (at Reinach, Basle) of the very numerous types of houses erected by them and of the material used, including different glass and heating apparatus which will vary according to the purpose of the house.

5. VAN DEN MUIJZENBERG, E. W. B. 631.544

Proeven met verschillende stralingsbronnen voor verwarming van kassen. (Trials with various sources of radiation for heating greenhouses.)

Overdr. Lab. Tuinbouwopleidt Wageningen, 31, 1944, 8 pp., bibl. 6.

The author reports the effect of various types of artificial electric radiation on the growth of plants in the greenhouse and the forcing-frame; his results are indicated by graphs and by illustrations from photographs of the effect on dahlia, spinach, and Chinese cabbage. The increased growth under radiation is to be attributed to the higher temperature due to the heat emitted by the sources of light.

6. VIJFVINKEL, L. 631.67: 631.544

Het warmwaterkanon. (The warm water gun.)

Meded. Direct. Tuinb., 1946, pp. 170-2.

Describes and illustrates an apparatus for providing water spraying, sprinkling and watering that is approximately the temperature of the greenhouse. This avoids the check to growth that might obtain from using very cold water direct from the water supply.

637. RADER, L. F., JR., REYNOLDS, D. S., AND JACOB, K. D. 631.84

Greenhouse and laboratory experiments with nitrogen-bearing aluminum dross as a fertilizer.

J. Amer. Soc. Agron., 1945, 37: 1024-32, bibl. 11.

The nitrogen (nitrates) content of 21 samples of dross from the melting and refining of aluminium alloys averaged 5.05%, ranging from 0.43% to 10.35%. The experiments were carried out with pot plants of millet and tomato. When the drosses were applied at a rate to supply 60 lb. of nitrogen per acre, they proved only 1.33% as effective in increasing the dry-weight yields as the same quantity of nitrogen applied in the form of ammonium sulphate. The value of dross as a fertilizer was found to be determined by the rate and extent of conversion of the dross nitrogen into ammonia and nitrate.

638. AHLBERG, O. 632.944: 631.544
Cyanvätebehandlingar i växthus. (HCN treatment in the greenhouse.)

Flygl. Växtskyddsanst. Stockh., 69, 1944, pp. 6.

A summary discussion of about 3,000 reports on greenhouse fumigation with HCN, received by the Swedish Plant Protection Station, Stockholm, during the period 1941-43. In about 33% of the cases the treatment was carried out against aphids and here 92% of the fumigations were successful, i.e. with kills above 75%, mostly 90-100%.

639. EDWARDS, K. B. 631.544: 631.588.1
Heated sand culture for the week-end gardener.

J. roy. hort. Soc., 1946, 71: 44-8.

A colourful account of an amateur's successful attempts to raise melons and other crops in sand cultures heated with cables of the single-ended type encased in one of the newer plastics. Electricity is supplied from a 5-amp. plug or a light socket.

640. MOORE, J. C., AND BRYAN, J. 631.53
Preserving boxes used in horticulture.

J. roy. hort. Soc., 1946, 71: 79-84.

Wherever possible, boxes made from western red cedar (*Thuya plicata* Lamb.) should be used for horticultural purposes, and they need no special treatment. It would appear from the tests carried out, however, that where Scots pine, Baltic redwood or red deal (*Pinus sylvestris* L.) is used, it is best to pin the boxes with galvanized nails and advisable to dip them, before use, for 15 seconds in a solvent type of preservative such as a 25% copper naphthene solution. Such treatment is to be recommended on grounds both of effectiveness and ease of application. [From authors' conclusions.]—The experiments were carried out at the Plant Pathology Laboratory, Harpenden, and at the Forest Products Research Laboratory, Princes Risborough, from 1935 to 1945.

641. MAKSIMOV, N. A. 631.588.1: 581.14
The use of artificial light to accelerate plant growth. [Russian.]

Proc. of the Scientific Conference of the Timirjazev Agric. Acad., 3-10 June, 1944, 1945, No. 1, pp. 14-6.

There are two methods by which electric light can profitably supplement natural daylight in the growth of plants. It can be turned on as soon as daylight begins to fail, in order to extend the period of light for as long as is considered necessary; or it can be utilized during the first few weeks of growth, which becomes then much more rapid until the plants are ready to be set out of doors. Such plants have been observed to flower and mature fruit earlier than usual, and could with advantage be grown in this manner in latitudes of short summers. The intensive utilization of electric light during the early stage of plant growth has been successfully employed in the raising of vegetable crops; and tree seedlings have reached in one year the same stage of development as others in three years. It is suggested that neon lights could be successfully used in raising plants.

642. PORTER, R. H.

El papel que desempeña un moderno laboratorio de semillas en la producción de cosechas. (The rôle played by a modern seed laboratory in crop production.)

Anal. Univ. Costa Rica, 1945, 3: 9-24.

The functions of a seed laboratory are stated as (1) investigation, a study of the problems relating to the quality of the seeds, (2) instruction, teaching the youth in the methods of seed analysis, (3) testing seeds in the laboratory for growers and for seed merchants, (4) scientific propaganda especially directed to growers and seed merchants on what is seed of superior quality, and problems relating to the production of such seed. Tests to which the seed is subjected are for the determination of (a) presence or absence of extraneous seed, (b) percentage of pure seed, (c) percentage of germination, (d) infection or infestation of the seeds by pathogenic organisms, (e) resistance to diseases and the effect of disinfectants. These tests are then discussed.

643. KRALIN, P.

631.531

Increasing the germination percentage of seeds. [Russian.]

Sovzhoznoe Proizvodstvo (State Farming), 1945, No. 3, pp. 14-20.

In certain parts of Siberia, cold and moist conditions begin too soon after a seed crop has been harvested to allow the seeds time to overcome their dormancy. As a consequence germination tests may lead to the false conclusion that the germination percentage is low, when in fact it could be high if the dormant seeds were stimulated. Before a seed can germinate, it requires not only water and a suitable temperature, but also air. The latter cannot penetrate the seed coverings until these have been made permeable either by physical damage, such as abrasion, or by wetting and drying. The latter process is described, and consists in spreading out the seed in a thin layer, constantly stirring it, in order to allow warm air to circulate among the seeds. The process should last 10 days at a temperature of 15° to 22° C. or 3 days at 30° C. The experiments described in the article were concerned mostly with cereal grains, but peas and sunflower are mentioned.

644. TUGARINOV, V. V., AND KRUČININA, Z. A.

581.192

Calculating the weight of substances when their moisture content has been increased. [Russian.]

Proc. Sci. Conf. Timiryazev Agric. Acad., 3-10 June, 1944, 1945, No. 1, pp. 84-5.

Among the substances to which the calculation applies are seeds and other agricultural products, the moisture of which needs to be calculated. It is explained how, if the moisture content of a substance increases by, say, 5% in weight, the weight of the substance increases not by 5 but by 6.25%; if then the moisture increases from 15% to 95%, the weight of the substance increases by 1,600%.

645. YARWOOD, C. E.

581.144.3

Detached leaf culture.

Bot. Rev., 1946, 12: 1-56, bibl. 332.

Detached leaf culture is defined as the maintaining of leaves in a living condition for various periods after detachment from the plant of which they were once a part. Detached leaves have not yet been induced to grow indefinitely, but individual leaves have been kept living for periods up to several months and in one case (iv) six years. Under the best conditions known, most detached leaves can be kept in good condition for about three weeks, a period that is long enough for most physiologic studies. They carry on most of the functions of normal attached leaves including transpiration, respiration, photosynthesis and protein synthesis. By culture of detached leaves in darkness, both photosynthesis and translocation are eliminated, and carbohydrate transformations can be advantageously studied. The floating of leaves on unsterilized solutions of commercial

cane sugar is now the most common method of leaf culture. Detached leaves have served as a convenient substrate for the total culture of plant pathogenic organisms, especially the obligately parasitic powdery mildews.

646. SOKOLOV, A. V.

631.541: 631.8

Transplantation as applied to the study of nutrition of different plant species.

C.R. Acad. Sci. U.R.S.S., 1945, 48: 135-7, bibl. 3.

With blue lupins grown in water cultures aluminium had a beneficial effect. Yet, blue lupins grafted on peas did better without aluminium in the solution. When yellow lupins were grown on a heavily limed soil they showed severe chlorosis and withering, but peas grafted on these chlorotic plants attained the blooming stage. Peas grown on their own roots in the same soil exhibited no signs of chlorosis. Similarly yellow lupins grafted on peas. It is concluded that in the case of lupins aluminium and calcium injury is connected with some effect of these elements upon the root.

—Dolgorukov Agrochemical Experiment Station.

647. HALIFMAN, I. A.

581.02: 575

Darwinian meeting of the Lenin Academy of Agricultural Sciences. [Russian.]

Priroda (Nature), 1940, No. 4, pp. 107-13.

Lysenko and other speakers at the meeting emphasized the necessity of recognizing the influence of environment on hereditary transmission. Experiments by Kovalevskaya into the grafting of tomatoes were cited as evidence of such an influence. Cicin referred to successful vegetative hybridization of woody and herbaceous species of *Leguminosae* (yellow acacia and white acacia) with peas, lentils, lupins, horse-beans, etc., and to sexual and vegetative hybridization of potatoes with tomatoes, tomatoes with tomatoes, tomatoes with potatoes, and sunflowers with related species. Lysenko also drew attention to Volkov's work in which the presence of chlorophyll is shown to be essential to the union of stock and scion: this postulates sunlight, plentiful moisture, and a temperature of 16° to 20° C.

648. ŠMUK, A.

631.541: 581.192

Biochemical changes of grafted plants and plant transplantation as a method of propounding and solving physiological and biochemical problems. [Russian.]

Proc. Lenin Acad. agric. Sci., U.S.S.R., 1945, No. 1-2, pp. 3-13.

The author reviews work by himself and others on the reciprocal influence of stock and scion with special reference to the presence or absence of alkaloids in relation to the presence or absence in the rootstock, chiefly in species of the family *Solanaceae*. The data, tabulated for a number of stock-scion combinations, show that, in general, the alkaloids of the rootstock will appear in the scion, although they are normally absent from the latter. The underlying physiological processes associated with the stock-scion relationship in such cases are discussed.

649. GAŠKOVA, O.

631.541

Grafting as a method of changing plants. [Russian.]

Proc. Lenin Acad. agric. Sci., U.S.S.R., 1944, No. 8-9, pp. 12-8.

A study of the seedlings of the 1st and 2nd generations intergrafting between species of the families *Solanaceae* and *Cucurbitaceae* shows that certain characters of the plants are modified by the exchange of substances across the graft union. By means of a second grafting (between *Solanaceae*) the modified characters became more pronounced. Tomato fruits of two varieties a series of modifications appeared (reduced number of loculi, disappearance of the increased size of fruit, change in the consistency of the fruit pulp, etc.). Some of these characters are of economic interest. In the cucumber variety Tokyo pistillate flowers developed on the basal instead of the lateral branches; this was accompanied by earliness in fruiting.

application of the "in tube" method of grafting yielded very successful results in vegetative hybridization.

50. PARKHOMENKO, M. 631.541.6
A new method for grafting herbaceous plants, applicable under field conditions.

C.R. Acad. Sci. U.R.S.S., 1945, 47: 517-9.

The author describes the method of grafting worked out by himself as a new method, but he seems to be unaware that it is but a slight variation of the so-called approach graft applied to herbaceous plants. By his method, for which most 100% success is claimed under field conditions, the stock and scion plants are grown closely together. At the desired height the apex of the stock is cut off and the top is cut to form a wedge. The wedge is inserted into a corresponding cut in the future scion and the union is bandaged. After 6-10 days the bandage is removed and replaced by a few turns of another bandage. When the union is complete the scion may be cut away from its roots. The practical and theoretical implications of the "new" method are discussed.—The Turkmenian Branch of the Academy of Sciences of the U.S.S.R., Ashkhabad.

51. BOSE, A. C. 581.192
Further note on an improved method of locating tannins in plant sections.

Current Sci., 1946, 15: 46-7.

The chief advantage of the described modification of the original preparation (noted in *H.A.*, 14: 1006) is that it is highly economical as it entails the barest minimum quantities of the chemicals required.

52. BLASER, R. E. 631.8
A device for setting fertilizer distributors accurately and a simple method of calibration.

J. Amer. Soc. Agron., 1945, 37: 857-8.

The device, which is described and illustrated, has been developed at the Florida Agricultural Experiment Station.

53. POST, J. J. 63: 519
Let's over de factoren, welke de groote der proefvelden bepalen. (On the factors which determine the size of trial plots.)

Meded. Direct. Tuinb., 1944, pp. 474-80.

The author discusses the factors which must be taken into consideration in deciding on the size of trial plots, under headings, (1) soil, particularly with regard to its homogeneity, (2) climate: exposure to wind, rainfall, drainage, (3) kind of plant under test, its spacing, (4) kind of trial under consideration: varietal, manurial, control of pests and diseases, spacing, time of sowing.

54. GROOTENHUIS, J. A., and POST, J. J. 519: 63

Het latin square als meest doelmatig proefschaem voor niet te groote proeven. (The suitability of the latin square for trials of a fairly simple character.)

Meded. Direct. Tuinb., 1946, pp. 173-5.

The latin square is the most suitable lay-out for trials where the factors are few, where the homogeneity of the ground is in doubt, and where the trials are repeated for several years.

Noted.

655. DAVIS, F. L. 631.416.2
a Retention of phosphates by soils: IV. Solubility of phosphates retained by virgin Hammond very fine sandy loam treated with $\text{Ca}(\text{OH})_2$ and H_3PO_4 . *Soil Sci.*, 1946, 61: 179-90, bibl. 11.

b DIX, W. 633/635(496)
Acker- und Pflanzenbaufragen in der Türkei. (Agricultural problems in Turkey.) [English summary 1 p.] *Landw. Jb.*, 1943, 93: 1-47.

c EYSTER, H. C. 577.15.04
Effect of auxins on the action of diastase *in vitro*. *Plant Physiol.*, 1946, 21: 68-74, bibl. 7.

d FIPPIN, E. O. 631.814
Plant nutrient losses in silt and water in the Tennessee River system. *Soil Sci.*, 1945, 60: 223-39, bibl. 5.

e GRACE, N. H., and FARRAR, J. L. 634.975: 631.535
Vegetative propagation of conifers. XIV. Note on seasonal progress of rooting of Norway spruce cuttings. *Canad. J. Res.*, 1945, 23, Sec. C, pp. 189-91, bibl. 11.

f MACDOUGAL, D. T., and DUFRENOY, J. 581.144.1: 5
Criteria of nutritive relations of fungi and seed-plants in mycorrhizae. *Plant Physiol.*, 1946, 21: 1-10, bibl. 10.

g RISCHKOV, V. L. 632.951: 581.14
On a defensive reaction of the plant cell. (A contribution to the comparative pharmacology of sulphonamides.) *C.R. Acad. Sci. U.R.S.S.*, 1945, 47: 520-2, bibl. 6.

h ROYAL METEOROLOGICAL SOCIETY (GUNTON, H. C.). 551.506.8
55th Phenological Report 1945. *Suppl. Quart. J. roy. met. Soc.* 72, 1946, pp. PR 43.

i RUSCHMANN, G., and OTHERS. 631.874
Die Wirkung von Braunkohlekomposten auf das Pflanzenwachstum und die Bodeneigenschaften. (The effect of lignite compost on plant growth and soil properties.) [English summary 1 1/2 p.] *Landw. Jahrb.*, 1943, 93: 48-109, bibl. 37.
Potatoes and oats served as test plants.

j TRELEASE, S. F., and GREENFIELD, S. S. 581.192: 546.23
Influence of plant extracts, proteins, and amino acids on the accumulation of selenium in plants. *Amer. J. Bot.*, 1944, 31: 630-8, bibl. 5.
Test plants were maize and *Astragalus racemosus*.

k WATSON, S. J., and SMITH, A. M. 631.811.9
The trace elements in plant and animal nutrition. *Scot. J. Agric.*, 1946, 25: 203-12.

TREE FRUITS, DECIDUOUS

General.

56. BRIGNETI, H. 634.1/8
Fruticultura general. (General fruitgrowing.) *Publ. Dep. Prop. agric. Minist. Agric., Lima*, 1944, 35 pp., 45 figs.

This is an introduction to fruit-growing in Peru. It begins with the rudiments of the anatomy and biology of plants as applied to fruit crops. It continues with notes on propagation (by seeds and asexually), grafting and budding, pruning, training and cultivation, irrigation, manuring, flowering and fertilization, the relation of bee-keeping to fruit-growing, harvesting the crop and packing the fruit, preparation of pesticides and fungicides.

657. AUBERT, P. 551.432: 634.1/2
Essais de culture fruitière en montagne. (Fruit cultivation trials in the mountains of Switzerland.) [German summary 1 p.] Reprinted from *Landw. Jb. Schweiz.*, 1941, pp. 431-52, bibl. 11, being *Publ. Stat. féd. Ess. vitic. arboric. Lausanne* 299.

The problem of planting suitable varieties of fruit trees at higher altitudes has occupied horticulturists of French Switzerland for over 40 years. The present publication reports the results of observations made from 1933 or 1934 to 1939 on plums and apples in experimental orchards, established at different altitudes in 1929. The varieties

are grouped in 3 categories:—(1) Doing well and maturing their fruits even in unfavourable localities; (2) Doing well at high altitudes but requiring higher temperatures than (1); and (3) Unsuitable for exposed, cold and damp localities of the Swiss Jura. The following apple varieties are listed under (1):—Titowka, Transparente blanche and Borowinka.

658. KESSLER, H. 634.1/8(453.2)
Obstbauliches aus dem Süd-Tirol. (Fruit growing
in South Tyrol.)

Schweiz. Z. Obst- u. Weinb., 1946, 55: 71-7, 85-9.

The report of a journey from Switzerland to South Tyrol undertaken in the winter of 1945/46. The author started his tour in the Vintschgau, where at an altitude of 500-700 m. apples are grown as half-standard trees in the valley and as bush trees along the slopes. Irrigation is generally practised. It is claimed that the keeping quality of apples grown at this altitude is far superior to that of apples produced lower down in the Meran area. Owing to the dryness of air, helped by frequent drying winds, scab incidence is negligible in the Vintschgau. Even standard Golden Delicious trees do well without treatment and the variety has become popular. Loss of market in the international resorts of Bozen and Meran and lack of transport facilities have reduced the previously important apricot industry to insignificance.—At the bottom of the Etsch valley, all around Meran, orchards extend to almost forest dimensions. Half-standard trees mixed with trees on dwarfing rootstocks are densely crowded to avoid sun damage, an arrangement which favours scab and has other disadvantages. Artificial irrigation is the rule, a circular area around each tree being dug. The production of finest dessert apples on cordons on the slopes near Meran—once so famous—is declining, as labour expenditure makes the industry unprofitable. On the other hand, it is interesting to note that American varieties, such as Jonathan and others, are now preferred. Still lower down, round Bozen, irrigation ceases to be necessary. The circular area around the tree receives silt and stable manure. In this region bomb damage is extensive and new plantings will have to be made on a large scale. To the south of Bozen, where almonds and figs are grown, bombing prevented control of the San José scale which in this district developed to a serious threat. It is a special feature of the fruit growing in South Tyrol that the entire crop is sold on the fresh market. There is no provision for canning or storage.

659. MEYER, A. 634.23: 581.05

Ueber einige Zusammenhänge zwischen Witterung und Kirschernte in der Nordwestschweiz. (Relations between weather and cherry crop in northwest Switzerland.)

Schweiz. Z. Obst- u. Weinb., 1945, 54: 155-9, 191-7.

This survey, which covers the period 1934-44 inclusive and is supported by diagrams and maps, shows the following relations between weather and cherry crop in northwest Switzerland: (1) The size of the crop is largely determined by the number of sunshine hours in late summer, autumn and spring. Rainfall in spring affects yields by favouring shot hole disease, which may, however, be successfully combated. (2) Heavy rainfall just before and during picking has a serious effect on fruit quality. (3) Cherries grown at high altitudes (up to 800 m.) mature 4-6 weeks later than early varieties grown in the vicinity of Basle (250 m.). Most of the cherries are grown at altitudes of 400-600 m. In future plantings varieties should be suitably selected so as to spread the harvest over a longer period and so avoid a glut on the market.

660. BRICHET, J. 634.63(65)
L'oliviculture et l'industrie oléicole algériennes en pleine régression. (Olive growing and the olive industry in Algeria in decline.)

Fruits Primeurs, 1945, 15: 47-53.

A strong plea is uttered that a country so naturally suitable

for olive growing as Algeria should set its house in order and produce, not just any old olive, but olives of first-class quality economically by abandoning haphazard methods and concentrating on standard production of high quality trees.

661. BELOHONOV, I. 634.1/7

Urgent measures for the restoration and development of horticulture. [Russian.]
Social. Sel'sk. Hoz. (Socialist Agriculture), 1944, No. 2-3, pp. 45-8.

This is an authoritative statement by the member of the administrative board of the Commissariat of Agriculture of the R.S.F.S.R. Hard winters and war operations have in recent years considerably depleted orchards in the central regions of the Soviet Union. The measures enumerated by the author include the following: (1) preservation and restoration of damaged orchards; (2) alteration of agricultural technique and introduction of frost-resistant varieties of fruit trees; (3) planting new orchards at collective farms and villages; and (4) increasing the area under fruit tree nurseries.

662. BAGENAL, N. B. 634.1/7

Planning an acre of mixed fruit.
Fruitgrower, 1945, 100: 334, 341.

The layout of an acre of mixed fruit, proposed in this broadcast, is based on two main ideas: (1) Leave a wide headland all the way round and wide spacing between the rows so as to allow two-way tractor cultivation between everything except raspberries and strawberries, where one-way cultivation will suffice. (2) Divide the orchard into a nitrogen half and a potash half by a broad track across the centre according to the manurial needs of the fruit. Further suggestions include the growing of peaches on bush trees in the open.

663. BLAKE, M. A., EDGERTON, L. J., AND DAVIDSON, O. W. 634.11: 581.02

The importance of environment for growing apples.
Circ. N. J. Jer. Exp. Stat. 498, 1945, pp. 24, bibl. 7.

It is the purpose of the circular to show how the apple grower can determine the climatic and soil resources of an orchard site.

664. CHEAL, W. F. 634.11

Apple growing in the Wisbech District.
Agriculture, 1946, 52: 548-51.

A survey of the development of the industry. The Wisbech district is windswept and has to contend with spring frost among other conditions which are not attractive to the modern fruit grower. Owing to the excessive vegetative growth peculiar to the fens and to the difficulty of obtaining colour, mainly culinary varieties are grown.

665. PRESTON, I. 634.12

Rosyblloom crabapples.

Canad. Hort. Home Mag., 1945, 68: 27-8.

The late Dr. W. T. Macoun gave the name "Rosyblloom" to a group of hybrid crab apples raised at the Central Experimental Farm, Ottawa. They have deep pink flowers and bronze purplish leaves. The parents were *Malus pumila* var. *niedzwetziana* and *M. baccata*. All have flowers with a faint perfume, but one variety, Chilko, very fragrant. The fruits show great variation in size and colour. Many of them make jelly of good flavour and beautiful colour. Brief notes on 15 varieties are given.

666. DENHAM, H. 634.21

Apricots. Some further observations.

J. roy. hort. Soc., 1946, 71: 101-4.

This note summarizes conclusions formed (from observations in the writer's own garden) since a former paper appeared (see *H.A.*, 12: 1310). It is considered that *Sclerotinia laxa* (*Monilia cinerea*) is responsible for most of the troubles in apricot, except for fruit drop, which

omatic, and possibly gumming. There has been clear evidence of infection of flower trusses through unopened buds, and infection and killing of young shoots from the disease on ripe fruits on the spurs from which the shoots originated, the disease apparently passing up the fruit stalk. Infection of ripening fruit is now regarded as more serious than blossom wilt, and appears to be caused by spores from fruits in the vicinity. The chief sources of infection in this garden are apparently Japanese cherries. Bordeaux mixture (preblossom) appears to be the most effective spray, with lime-sulphur almost as good and colloidal sulphur a bad third. Tar oil winter wash, even dilute, is regarded as inhibiting the growth of vegetative buds, leaving blossom clusters unsupported by a new shoot, and consequent naked wood. The aim of training and pruning apricots is to provide a framework of parallel branches or buds originating as low in the tree as possible and intended to have a limited life on a rotational system. The best replacement or foundation branches come from strong axillary buds in the first flush of growth in spring, which normally produce strong lateral growth close behind the leading bud. These laterals are thumbnail pruned at about 4 or 5 leaves, when they are about 5 inches long and till in the pink shoot stage.

67. JUNGE, E. 634.8 + 634.21
Edelobstbau. Teil II. Reben und Aprikosen.
(Dessert fruit growing. Part II. Grapes and apricots.)

Grundl. u. Fortschr. i. Garten-u. Weinb.* H. 55, 1939, pp. 79, RM. 2.20.

Germany, grapes are grown on south walls in many districts outside the viticultural areas. The author's aim in providing detailed information on all phases of grape growing is to encourage table grape production under suitable conditions. In particular villages in the vine growing areas could be beautified by growing grape vines in house walls. Apricot growing in Germany, even in favourable locations in the Rhineland, is precarious. This is borne out by a crop survey for the period 1898-1921, carried out by the author: There were 7 complete failures, unsatisfactory, 5 fair, 2 good and 5 very good crops in these 24 years. For planting in orchards standard trees are recommended, the height of the stem not exceeding 1.7 m. In nurseries, St. Julien plum is used as a rootstock on which a vigorous, straight-growing plum variety is worked as a stem builder. The apricot is budded at the desired height. In certain areas, however, growers raise apricot seedlings to crown height and then bud the variety. This method takes longer and produces mis-shaped trees, at least initially, but the plants are more resistant to cold winds and have a longer life than the normal 25-30 years of commercially produced trees. Planting and pruning are discussed in detail; the five principal varieties are described.

Varieties.

68. SIMMONDS, A. 634.11
The origin of apple 'Annie Elizabeth'.

J. roy. hort. Soc., 1946, 71: 14-5.

The apple Annie Elizabeth was raised from seed from a fruit of Blenheim Orange by Mr. Samuel Greatorex of Leicester (1804-71). The original tree is believed to be still standing in the garden of 46 Avenue Road, Leicester.

69. TRAAS, C., Jr. 634.11
Cox Orange Pippin.

Fruitteelt, 1946, 36: 32-3.

The three most popular apple varieties in the Netherlands at present are Goudreinette, Brabant Bellefleur and Sterappel. The writer discusses the possibility of Jonathan replacing Bellefleur and Cox being grown instead of Sterappel. The disadvantages of Cox (susceptibility to canker and scab) and

its good qualities (regular cropping and good flavour) are set out, and notes are given on rootstocks (Malling II has given good results in the Zeeland experimental garden; XIII was less satisfactory in some places), form of tree, regrafting with Cox, pollinator (James Grieve recommended), and pruning.

670. ZORIN, F. 634.1/3
Results of breeding and selection of various fruits at the Soči Experimental Station. [Russian.]

Social. Seljsk. Hoz. (Socialist Agriculture), 1944, No. 5-6, pp. 56-9.

The Black Sea coast of the Krasnodar Province represents climatically a transition zone from the temperate to the sub-tropical horticultural belt. The area under horticultural plantations is more than 10,000 ha., i.e. 32% of the total area under farm crops. More than 60% of all plantations consist of plums [Italian variety of Hungarian plum] and filberts [*Corylus avellana*, *C. maxima*]. In recent years plantations of citrus fruit have also been laid down. A description is given of 4 hybrid plums, 8 hybrid filberts, and 2 mandarin and grapefruit varieties.

671. MAURI, N. 634.37(65)
Les figuiers cultivés en Algérie. Notices spéciales de gravures. (Algerian fig varieties illustrated.)

Bull. Dir. gén. Agric. algér. 93 bis, 1944, pp. 103. The fig varieties grown in Algeria and described in Bull. 93, 1942, of the same series (H.A., 14: 1492) are illustrated by photographic plates. At least 3 plates are devoted to each variety, showing its growth habit and its leaf and fruit characters. A few pictures deal with the effect of pollination on fruit formation, with insect damage and 4 other subjects.

Propagation.

672. WINKELMANN, H. 631.541: 634.1/7
Veredlung und Veredlungsarten in der Obstbaumschule und im Obstbau. (Budding and grafting of fruit trees.)

Grundl. u. Fortschr. i. Garten-u. Weinb.* H. 39, 2nd edition, 1944 (?), pp. 86, RM. 2.20.

A thorough and well illustrated description of the budding and grafting of fruit trees, including walnuts and soft fruit. Rootstocks are also discussed at some length. In order to guarantee trueness to variety the establishment in all fruit growing areas of variety collections is recommended, where the more important varieties of different kinds of fruit would be grown. Large nurseries might care to establish their own collections. By severe pruning the trees could be made to yield scion wood for a long time. These collections would have the additional advantage of helping buyers, especially non-professional, to choose the variety they want. Great care must be taken in selecting scion wood for such collections from the best specimens of each variety.

673. ŠITT, P. G. 634.1/7-1.541
The production of dwarf fruit trees. [Russian.]

Proc. Sci. Conf. Timirjazev agric. Acad., 6-13 Dec., 1944, 1945, No. 2, pp. 82-9.

The methods described are applicable to apples, pears and other cultivated tree fruits which take a long time to come into bearing. In early spring a portion of the peripheral root system is exposed and a piece of well-branched root is cut off. Its distal end having been trimmed a little, the root is put in a warm position and covered with earth in order to hasten sap movement. When the right moment has arrived, the root is grafted to the distal end of a branch of a tree which is about 18 to 20 years old. The portion of the branch chosen must be 2 to 4 years old, and bear numerous fruit spurs; it must not, at this stage, be cut off the parent tree,

* Ulmer Verlag, Stuttgart.

but the root is grafted to it (approach grafting) by slicing off an area of bark from root and branch, and bringing the exposed cambial surfaces together. The lower end of the root is buried in a pot of soil which is fixed below the graft. Early in August, as soon as active growth ceases, the branch below the graft must be tied with wire, in order to prevent the sap from the leaves passing down towards the trunk, and to divert it into the grafted root. The passage of sap from the parent tree into the branch is not hindered. At the end of August or early in September, the branch can be cut off the parent tree, and so become an independent tree which will bear fruit in the following year. It should be emphasized that both root and branch, though each taken from the young and active portions of the root system and crown respectively, must belong to mature trees, if a dwarf character is to be ensured. An alternative method to that described above is to cut off in early spring, before sap movement, a suitable branch such as that employed in the first method, and to graft it on the roots of the same or another tree. Until the roots are ready, the branch must be stored in damp sand at a temperature of 3° or 4° C. As soon as spring weather approaches it must be put into an ice-house, or covered with snow. Meanwhile a portion of the peripheral root system near the surface is unearthed, but covered with straw until the sap begins to move. A suitable root, of the same thickness as the branch to be grafted on it, is cut through. A branch can be grafted on each of the cut ends. The distal end of that portion of the branch attached to the tree is bent upwards, young fibrous roots being thus encouraged to grow from the outer curve, while the erect distal end becomes the stem of the new tree. After the fibrous roots have developed, wire is tied round the parent root above the point from which they have sprung; and at the end of September the new tree can be separated from the parent. The branch which has been grafted on the proximal end of that portion of the root left in the ground takes the place of the parent tree, and as soon as it is united with the root it becomes an independent tree.

674. HILTON, R. J. 634.1/7-1.541.44
Framework of fruit trees.
Eighty-second A.R. Nova Scotia Fruitgr's Ass.,
1945, pp. 98-109.

Grafting done in early spring allows much stronger top-growth during the two years immediately following the operation, than when it is delayed until June. Moreover, early grafted trees gave more fruit than late grafted trees in the first main cropping year. Scions of 8-bud length had little, if any, more effect upon fruiting and growth than scions of 4-bud length. The per cent. "take" of the longer scions was slightly better. Where suitable small laterals are available for stub grafts, they appear to be the best all-purpose graft of the four framework methods [Cleft: stub and side. Bark: inverted L and awl]. On the basis of three seasons' records, all four methods made good growth, showed a high percentage of living scions, and seem to be cropping in equal relation to the amount of growth made. In practice, all methods may be employed, as the circumstances, tools, type of stock and season dictate. Framework induces a return to normal cropping much more quickly and in greater volume than topworking. It appears that the first good crop on framework trees will pay for the extra labour and materials. There is no advantage in spacing scions on mature trees at less than 16 inches apart. [Author's conclusions.]—The experiments were carried out for 4 seasons at the Experimental Station, Kentville, N.S.

675. DUFOUR, A. 634.1/2-1.541.44
Greffage en coulée—deux méthodes: un bon résultat. (Framework, two successful methods.)
Rev. hort. suisse, 1943, 16: 69-73.

The author describes two methods of rindgrafting which have proved successful in framework fruit trees in

Switzerland. Friedrich's method is a modification of which is known in England as the inverted L method. Page's method approximates to the slit method, the stock being cut away at one side of the slit to permit easier entry of the scion. It may be noted that emphasis is laid on the fact that short scions were used and that good growth was obtained. English experience indicates that the use of short scions unnecessarily delays fruiting.

Pollination.

676. KOBEL, F., AND TERRIER, C. 634.1/7-581.192
Fécondation et fructification chez les arbres fruitiers. (Fertilization and fruiting in fruit trees.)
Publ. Stat. féd. Ess. vitic. arboric. Lausanne 337, undated, pp. 16, being Publ. Sous-Stat. féd. Arboric. fruit. Valais 1.

The publication is a translation of *Flugschr. Wädenswil Versuchsanst. Obst-, Wein- u. Gartenb.* 16, adapted to the conditions of the Valais. Fruit varieties are listed under the following headings: Acid cherries for cross fertilization; self-fertile acid cherries; plums for cross fertilization; self-fertile plums; apples and pears with good and bad pollen; early, semi-early, semi-late and late flowering plum pollinators for 28 and 32 apple and pear varieties respectively; combinations of apple and pear varieties for valley, hillside and mountain orchards. The fertilization of fruit trees has been studied at Wädenswil for a considerable period.

677. JOHANSSON, E. 634.1/7: 581.162.3
Sortkombinationer i fruktträdgården med hänsyn till behovet av Korsbefruktning. (Fruit variety combinations ensuring pollination.) [English summary ½ p.]
Strökskr. Sveriges pomol. Fören., 6, 4th revised edition, 1944, pp. 27.

On the basis of trials carried out in Sweden suitable pollinators are recommended for a large number of apple, pear, plum and cherry varieties listed in alphabetical order.

678. QUINN, N. R. 634.23: 581.162.3
Cherry pollination.
J. Dep. Agric. S. Aust., 1942, 45: 410-1.

Pollination trials were carried out with cherries at Bask Range, one of the main cherry growing districts in South Australia. Three of the varieties chosen for the investigation were raised locally, the fourth was imported from Victoria some 50 years ago. All 4 varieties, Driver's Dropout Up-to-Date, William's Favourite and Beauchamp's Black, were found to be self-sterile. The last-named variety appeared to be a satisfactory pollinator for the three others and vice-versa.

679. VARMA, S. S. R. 634.22: 581.162.3
Pollination of plums in Patiala State hill orchards.
Punjab Fruit J., 1945, 9: 134-6.

The advantages of planting plum varieties so as to ensure satisfactory pollination is stressed. Lists of plums grown in Patiala are given showing (1) varieties that are self-fertile and those that are not, (2) varieties arranged as to whether they bloom early, mid-season, or late, (3) early and mid-season Japanese plums. The blossoming periods of the leading varieties are given with the reservation that it must be borne in mind that the general blooming period is retarded by one day for every 101 feet elevation, and the average rate of retardation is 4 to 6 days for every degree of northern latitude.

Cultural practice.

680. SNELL, R. S., AND STELLATELLA, S. 631.537: 631.51
Nursery marker and furrow-opener.
J. Amer. Soc. Agron., 1945, 37: 862-3.

A horizontal iron bar bolted to the cultivator attachment

TREE FRUITS, DECIDUOUS

the tractor carries the required number of triangular shovels at the ends of short vertical rods. The nursery marker and furrow-opener has its own marking rod that is used to make guide line for the near front wheel of the tractor on the return. Two vertical guides eliminate sway in the cultivator attachment.—New Jersey Agricultural Experiment Station.

681. STYLE, L. 634.1/2-1.542

More sympathetic fruit pruning.

J. roy. hort. Soc., 1946, 71: 37-42.

The pruning in private gardens of pome, stone and bush fruit is discussed.

682. PINTO CESAR, H. 634.1/8-1.542

A poda de inverno. (Winter pruning.)

Rev. Agric., São Paulo, 1945, 20: 355-7.

Because of the fluctuation in the seasons in Brazil pruning—especially that of the grape-vine—should be based on the condition of the tree or vine and not on the calendar. If the winter pruning is too early the trees are forced into growth again before winter and the shoots thus produced suffer from the winter cold. On the other hand, if pruning is left too late, the apical parts of the shoots will have started into growth and consumed some of the available foodstuff. Pruning therefore should be carried out when the trees are completely dormant.

683. GOURLEY, J. H. 634.1/7-1.8

The nutrition of fruit trees.

Eighty-second A.R. Nova Scotia Fruitgrs' Ass., 1945, pp. 71-81.

Some general principles are elaborated. While no proof can be offered at present, the author is of the opinion that in the orchard a better balance of nutrients is maintained under mulch than under cultivation. Where a mulch is used, many elements ultimately reach the soil through leaching or decomposition and the resulting high organic matter content has a stabilizing effect. Reduction of nitrogen applications is recommended rather than heavy pruning to improve fruit colour in apples.

684. WALLACE, T. 634.11-1.8-2.19

Practical aspects of the manuring of fruit trees in gardens.

J. roy. hort. Soc., 1946, 71: 16-23, bibl. 4.

The first lecture of the recently formed R.H.S. Fruit Group was held at Long Ashton in October 1945 and concerned the main problems of manuring fruit trees in private gardens. The paper is supported by 8 photos showing the effect of mineral deficiencies on apples and differences in varietal reaction to such deficiencies.

685. GEIGER-VIFIAN, A., AND FRITZSCHE, R. 634.1/7-1.8

Zur Düngung der Obstbäume. (Manuring fruit trees.)

Schweiz. Z. Obst- u. Weinb., 1946, 55: 35-9.

The application of fertilizer solutions to fruit trees by the injection method, as described *ibid.*, 1945, 54: 272-6, 287-94; *H.A.*, 15: 1469, frequently causes engine trouble in the spraying machine owing to a residue in the solution. This can be avoided by allowing the residue to sink to the bottom of the container in which the solution is prepared and drawing the liquid off. Analyses showed that in view of the low concentration losses are negligible; they average P_2O_5 6%, N 5% and K_2O 10%. The residue may be composted.—Wädenswil Horticultural Research Station.

686. GAYFORD, G. W. 634.13-1.8

A fertilizer trial on W.B.C. pears in the Goulburn Valley.

J. Dep. Agric. Vict., 1945, 43: 459-63, bibl. 1.

The principal conclusion drawn from a fertilizer trial on Williams' pears under irrigation, carried out since 1936 at Shepparton, Goulburn Valley, Victoria, is that the trees require continuous applications of nitrogenous fertilizers.

An annual application of 5 lb. per tree of nitrate of soda or of a complete 4: 4: 1 fertilizer proved sufficient for the maintenance of productivity and healthy annual growth. Further observations show that applications of nitrogen alone appear to delay fruit maturity to a slight extent and that a decline in yield does not immediately follow the discontinuance of fertilizers. The trees were 15 years old when the experiment began. Three treatments, namely no fertilizer, nitrogen only and complete fertilizer, were compared. The fertilizer was applied in winter (August) under the spread of the branches and ploughed in. A programme for future trials is outlined.

687. STARK, A. L. 634.25-1.8

Experiments show benefits of fertilizers in peach orchards.

Farm Home Sci., 1944, 5: 2: 4, 11.

Continued cultivation of peach orchards in Utah resulted in a marked decrease in yield. In 1940, the Utah Agricultural Experiment Station set up experiments in Box Elder and Utah counties to determine the most suitable soil management and fertilizer practices under local conditions. Five fertilizer treatments were applied. Fruit from trees receiving no fertilizer or phosphorus only ripened much earlier and more uniformly, showed a higher sugar content and higher colour than that from trees receiving nitrogen, manure, or a combination of nitrogen and phosphorus. However, fertilizers had a great influence on vigour which in its turn was correlated with yield. The largest amount of good quality fruit was produced by a combination of ammonium sulphate and treble superphosphate. In addition, green manure or cover crops should be used in the absence of stable manure.

688. DAS, S. 634.21-1.84

Apricot seed cake as a nitrogenous manure.

Ind. J. agric. Sci., 1945, 15: 30-6, bibl. 9.

The wild apricot grows abundantly on the Simla hills. The fruits are eaten and oil is obtained from the kernels. The kernels constitute about 20% of the pits and contain 40-45% oil. The cake left after the oil is extracted contains 0.057% of hydrocyanic acid and, as it cannot be used as a cattle food, it has been used only as fuel. It contains, however, 6.7% nitrogen, 1.49% P_2O_5 and 1.09% K_2O , and the possibility of its being used as a manure is here considered. Experiments showed that about 60% of the nitrogen in the cake was transformed into available forms in three dissimilar types of soil, and the conclusion is that the cake will undoubtedly prove an efficient nitrogenous manure for soils which are particularly deficient in this constituent, and especially so in agricultural lands where it is available in plenty but at present used as fuel.

689. THOMAS, P. H. 634.1/7-1.874

Orchard cover crops.

Fruit World, Aust., 1945, 46: 3: 20.

In certain districts of Tasmania, and especially on the lighter class of loams, there has been a tendency to deplete and lower the humic content of the soil by clean cultivation. Clean cultivation in spring followed by a cover crop in autumn is recommended. The principal cover crops, with rate per acre, that can be grown in Tasmania are: horsebeans 1½ bush.; peas 2-3 bush.; vetches (tares) 1½-2 bush.; lupins 1½-2 bush.; clovers 10-12 lb.; rape 2-4 lb.; oats 3 bush.; rye 1½ bush. For the last three, when grown in conjunction with a legume, the rate per acre is correspondingly decreased.

690. GOURLEY, J. H. 634.1/7-1.51

Some effects of orchard culture upon the soil and tree.

Eighty-second A.R. Nova Scotia Fruitgrs' Ass., 1945, pp. 61-8.

The effect of mulch on an orchard soil in Wooster, Ohio, is demonstrated by the following figures: A given volume of

soil (321 c.c.) under established mulch weighed 397 g. that under sod 415 g. and that under tillage 434 g. In the same locality 1·76 c.c., 1·06 c.c. and 0·58 c.c. respectively, of water was absorbed per minute, the percentage of soil aggregates over 1 mm. in soils under mulch, sod and tillage being a further indicator of the extreme compactness of tilled soils. The aggregation phenomenon is closely related to the organic matter content. In Wooster orchards the soil under mulched trees was found to contain nearly 5% organic matter, as against about 2% in the adjacent tilled land. The organic matter content and moisture percentage of soils under cultivation and under straw mulch at 4 depths is indicated in a diagram and a table. The need of a rather heavy mulch is emphasized, if moisture is the limiting factor. The soil of the Wooster orchard is low in potash. Potassium determinations showed 175 lb. available potassium at a depth of 2 feet beneath the tilled trees and 1,000 lb. beneath the mulched ones. Since potash in straw, hay, etc., is readily leached out by weathering, the material should be applied as soon as cut, unless the supply of nutrients is of no importance. Trees grown in the mulch system were found to be sufficiently supplied with nitrates, additional annual nitrogen applications having given no obvious results. The surface 6 in. under mulch showed a calcium content of 900 p.p.m. as against 600 p.p.m. under cultivation, and an increase in phosphorus content of 800%. Boron and magnesium ran about 50-60 p.p.m. and 100-125 p.p.m. under tillage, as against 75-90 p.p.m. and 180-190 p.p.m. respectively under mulch. Although there was a difference in yield between tilled and mulched trees in favour of the latter, it was much less striking than expected. The explanation offered is that in the orchard studied, which is very favourably situated, the factors under consideration have not been the limiting factors.

691. PENNEFATHER, R. R. 634.67
Programme for spring irrigation.
Fruit World, Aust., 1945, 46: 9: 6.

This short article elaborates the following points: 1. Don't water before you have to. 2. Don't water all the surface. 3. Water long enough to wet only the first 24 inches. 4. Irrigate at the right frequency. 5. Prepare your ground well. 6. Success depends on timing.

692. REBOUR, H. 634.1/8-1.67
La conduite de l'irrigation dans les cultures fruitières en Algérie. Fasc. I. (Irrigation practice in Algerian orchards. I.)
Bull. Inspect. gén. Agric. algér. 72, second edition, 1945, pp. 87, bibl. 32.

For an abstract of the first edition see *H.A.*, 14: 1530. Apparently, there have not been many alterations in the second edition, but a few paragraphs have been enlarged.

693. REBOUR, H. 631.67
A la recherche de l'eau perdue. (How to conserve water when furrow irrigating.)
Fruits Primeurs, 1945, 15: 165-72.

A discussion of the loss of water experienced during irrigation and how best to avoid it by considered lay-out and spacing of furrows.

694. SWARBRICK, T. 634.1/2: 577.15.04
The prevention of pre-harvest fruit drop.
Agriculture, 1946, 52: 509-11.

A brief summary of results obtained at Long Ashton and elsewhere with alpha naphthaleneacetic acid salts and amides for preventing pre-harvest fruit drop of apples and pears.

695. CHEAL, W. F. 634.11: 577.15.04
Hormones and fruit drop.
Fruitgrower, 1946, 101: 52.

At North Brink, Wisbech, two blocks each of four standard

trees of Worcester Pearmain were treated with two unnamed hormone preparations on 3 August, 1945. Corresponding groups of trees were left unsprayed. When the fruit was harvested on 31 August, the percentage drop in the sprayed plots amounted to 29 and 26 as compared with 62 and 54 respectively in the controls. The question is raised whether hormone treatment against fruit drop may affect the vigour of the fruit buds in the next season.

Harvesting and marketing.

696. ROUSSEAU, P. M. 634.63-1.556
La cueillette mécanique des olives. (Picking olives by machinery.)
Fruits Primeurs, 1944, 14: 209-12.

A consideration of the different mechanical devices for harvesting olives based on combing, shaking, shocking and blast leads the author to the conclusion that no known device is in its present state entirely satisfactory, but that development of the blast or blower method is most likely to prove successful in the future.

697. VAN STUIVENBERG, J. H. M. 664.85.11: 612.014.44
De invloed van de lichtbehandeling op de houdbaarheid van den sterappel. (The effect of light-treatment on the keeping quality of Star-apples.) [Summaries in Dutch, French, English and German.]
Meded. Inst. Onderz. Verw. Fruit Groenten Wageningen, 1942, rks. 1, No. 7, pp. 20.

Red and dark red Star-apples (var. Red Star), whether they have coloured on the tree or have been induced to colour (by exposure to light) after picking, are not suitable for prolonged cold-storage. The light red to uncoloured fruit should be selected for storage, the deep red fruit for more immediate consumption. Large fruits should not be stored. For colouring after picking the fruit need not be exposed to direct sunlight; good coloration can be obtained with small light intensity. If Star-apples are made to put on more colour after picking, the exposure to light should be discontinued as soon as a pinkish tinge appears; this occurs most rapidly if the fruits are kept near the ground (supported on gauzed frames).

698. HINCHCLIFFE, E. 658.8: 634.1/7-635.1/7
Fruit and vegetable marketing in the United Kingdom.
Fruitgrower, 1945, 100: 50, 144, 299, 340-1.

This post-war planning survey of fruit and vegetable marketing in Great Britain forms Part V of a study of the whole subject, the previous four parts dealing with the periods 1919-29, 1929-39 and 1939-45 having been published elsewhere. A change in the system of control is here advocated.

699. THOMAS, W. P., AND BLANCH, G. T. 658.8: 634.1/7-635.1/7
Marketing fruits and vegetables in Utah.
Bull. Utah agric. Exp. Stat. 316, 1945, pp. 67.

An analysis of the position and suggestions for adjustment necessary to meet post-war requirements.

Noted.

700. ŠIRR, P. 634.1/7
a Orchard management on State farms. [Russian.]
Sovznoe Proizvodstvo (State Farming), 1945, No. 3, pp. 25-9.
Elementary instruction.

SMALL FRUITS, VINES AND NUTS

SMALL FRUITS, VINES AND NUTS.

701. BLAIR, D. S., AND DAVIS, M. B. 634.7
Bush fruits.
Publ. Dep. Agric. Canada 775, 1945, pp. 22, being
Fmrs' Bull. 131.
 Deals with all aspects of raspberry, currant, gooseberry and blackberry culture in Canada, excluding pests and diseases. Boysenberry culture is briefly discussed. The bulletin is illustrated.

702. PAVLOVA, N. M. 634.71 + 634.72
Initial material for the breeding and cultivation of small fruits. [Russian.]
Vestnik Social. Rasten. (Soviet Plant Industry Record), 1940, No. 5, pp. 33-46.
 The size and great variety of climatic and soil conditions of the U.S.S.R. make it necessary to provide a large assortment of varieties of berry fruits so that maximum yields of high quality fruit may be obtained. The present paper aims at indicating (1) the main breeding problems for each type of fruit, and (2) the main features of the varieties and wild species suitable as initial material for breeding; it also offers suggestions for raising the yield of the plantations in the northern regions of the country after the winter ravages of 1939-40. Details are given of Russian and other varieties of black and red currants, gooseberries and raspberries promising for breeding purposes, with observations on their economic and nutritional value and suggestions for the possible use in breeding of local or other varieties. The black currant, *Slava Leningrada*, is mentioned for its resistance to fungous diseases and also to mite, the latter being dependent on compactness of the buds. In the Far East, crossing between *Ribes dikusha* Fischer and European varieties has produced some promising hybrids, and one, Primorsk Champion, is undergoing selection at the Vorosilov Fruit and Berry Experiment Station. Such forms are specially useful in regions where frost resistance is needed. For drought resistance *Ribes americanum* Mill. is recommended, while for Central Asia crosses of the American with the black currant should be tried; the latter ripens earlier than the American and the berries do not fall so easily. In breeding red currants for resistance to anthracnose the value of the large Siberian forms of *Ribes petraeum* Wulf and some of its hybrids with European varieties are specially mentioned. The sugar and vitamin C content of different varieties is recorded. Reduction in the number of seeds is also a character that should receive attention from the breeder. *R. atropurpureum* C. A. Meyer, *R. palczewskii* (Jan) Pojar and *R. mansuricum* Komar, which occur in Asiatic Russia are also regarded as of possible interest. An annotated list of varieties of interest to breeders is given. With reference to gooseberries, interspecific hybridization is thought to be the only method of producing an American type equalling the European in berry size and flavour. Results with the first generation gooseberry hybrids from breeding operations begun in the U.S.S.R. in 1933 with American or European varieties crossed with Asiatic forms are enumerated with reference to differences in *Sphaerotheca* resistance, dominance of wild type habit and berry size. The world assortment of raspberries includes over 600 varietal names. The origin and distribution of the European and American raspberries are indicated. Only the red forms are of industrial importance in the U.S.S.R. Habit, number of spines, vigour of vegetative multiplication, yield, frost resistance and berry qualities are factors to be considered in the choice of varieties. Methods of improvement are discussed. Interspecific crosses of varieties derived from the red and the black types have often given good results; but the poor

frost resistance of the black raspberry and its hybrid, the purple form, makes successful selection for northern regions unlikely.

703. FASSETT, N. C. 634.71
Mass collections: *Rubus odoratus* and *R. parviflorus.*
 Reprinted from *Ann. Mo. bot. Garden*, 1941, 28: 299-374.
 A study of variations and geographical distribution of the two *Rubus* species, supported by maps and photographs.

704. KRUFT, F. 634.711
 Neuzzeitlicher Himbeerbau im Erwerbsbetrieb und im Garten. (Modern raspberry cultivation, private and commercial.)
*Grundl. u. Fortschr. i. Garten-u. Weinb.** H. 51, 1939 (?), pp. 71, RM. 2.
 There have not been many books entirely devoted to raspberries, hence a note of this monograph, though published 7 years ago, may be welcome. Raspberry cultivation in Germany seems to be capable of considerable expansion without competing with other valuable crops. It is worth while in localities where no fruit thrives and where not even potatoes or turnips are at their best, as for instance the many slopes in southern and eastern Germany, which were vineyards until the *Peronospora* and *Oidium* epidemics devastated them some 50 years ago. All climates with an annual average temperature not below +7.5° C. should be suitable, provided the extremes are not too severe. An average of 1,713 and 1,759.5 hours of sunshine recorded for western and eastern Germany respectively has proved sufficient for fully maturing fruit and canes. An annual rainfall of 800-900 mm. is considered optimum, but berries need not necessarily lose their flavour in localities with 1,000 mm. rainfall or more. Among the cultural operations, which are fully discussed from the practical point of view, prominence is given to mulching with stable manure or other material. It is described as the most important single measure and as indispensable on light soils. English readers may be surprised at the comparatively low degree of mechanization in German horticulture, which becomes apparent in the paragraphs dealing with the problem whether a horse or an ox is the more appropriate choice for a raspberry plantation. Relatively little space is devoted to diseases and pests, spur blight being by far the most important trouble the German grower has to contend with. Lloyd George, though less productive than some German varieties, is recommended for all danger areas. Virus diseases are not mentioned.

705. COE, F. M. 634.711
Red raspberry varieties for freezing, local market, and home use.
Farm Home Sci., 1944, 5: 2: 3, 11.
 The merits are discussed of 7 raspberry varieties extensively tested at the Utah Agricultural Experiment Station and of several seedlings more recently introduced.

706. WATT, J. H. 634.725
Cape gooseberry culture [in New Zealand].
N.Z. J. Agric., 1945, 71: 131-3.
 In New Zealand, the cape gooseberry, *Physalis peruviana*, is chiefly grown at Motueka in the Nelson district, but it is suggested that other areas would also lend themselves to the cultivation of this increasingly popular fruit.

707. MORGAN, C. N. 634.75
Strawberry culture.
Qd agric. J., 1945, 61: 330-9.
 The main producing areas of strawberries in Queensland are within 150 miles north and 50 miles south of Brisbane, the picking period extending in many seasons from early June to the end of November. Phenomenal and Aurie are

* Ulmer Verlag, Stuttgart.

grown as leading commercial varieties, both having originated locally.

708. LUCKAN, J. 634.75
Beerenobst. Teil I. Erdbeeren. (Small fruits.
Part I. Strawberries.)
*Leistungsteigerung im Gartenbau** 14, 1942,
pp. 68, 3rd edition, RM. 2.50.

For a review of the first edition see *H.A.*, 7: 520. The third edition incorporates the results of long-term German research work carried out at several places. The chapter on strawberry varieties was revised by an expert of the German Ministry of Agriculture.

709. CHEAL, W. F. 634.75
Strawberries in the Wisbech district.
Agriculture, 1946, 53: 39-42, bibl. 7.

History and practice of strawberry growing in the Wisbech district. Since the early 1920's the situation has been dominated by the yellow-edge problem. Brenda Gautrey, generally planted as a counter measure, promised well as a tolerant variety. Later, it was observed that this variety also begins to break down in the absence of an adequate water supply. New developments in the manufacture of equipment will make it possible also for the small grower to control strawberry aphids by means of nicotine fumigation.

710. KATINSKAJA, J. K. 634.75: 575(47)
The best varieties of strawberry for the northern
and central zones of the Union. [Russian.]
Vestnik Social. Rasten. (Soviet Plant Industry
Record), 1940, No. 5, pp. 47-53.

In view of the economic and nutrient value of the strawberry the need is pointed out for extending the area of cultivation northwards in the U.S.S.R. and for ensuring a proper choice of pure varieties for the very varied conditions of the country. A system of official approval of tested varieties is recommended. The introduction of new, or the use of locally bred varieties is important.

The Institute of Plant Industry has made a selection of promising European and American strawberries and some of these new varieties, which include frost resistant types, are described with indications of their suitability for various regions.

The main aims are the production of (1) early, high quality, high yielding varieties that stand transport; (2) late monoecious varieties of high quality and yield; (3) varieties with dark coloured fruits and flesh with a high sugar and acid content for processing; and (4) varieties for forcing under glass.

711. MORRIS, H. E., AND AFANASIEV, M. M. 634.75-2.8

Montana Progressive strawberry. A yellow-resistant, everbearing variety developed during research on yellows.

Circ. Mont. agric. Exp. Stat. 181, 1945, pp. 2.

The Montana Progressive strawberry originated as a seedling of the Progressive strawberry, which is very susceptible to yellows, described as a "non-infectious" disease. The new variety is also everbearing and compares favourably with its parent in respect of fruit quality and yield. It has remained free of yellows for 7 years and has been in commercial production for 3 years in the Bitterroot Valley, Montana.

712. BANGA-OELMEYER, L. J. M. 634.75-1.536

De invloed van den planttijd en van enkele andere factoren op de opbrengst van aardbeien. (The effect of time of planting and of certain other factors on the yield of strawberries.)

*Overdruk. Lab. Tuinb. Inst. Onderz. Verw. Fruit
Groenten Wageningen* 29, 1943, 14 pp., reprinted
from *De Fruittelt*, Jrg. 1943, p. 102.

The author describes experiments into the effect on the yield of strawberries of the time of planting of the young plants,

* Bechtold Verlag, Wiesbaden.

the age of the parent plant from which the runners were taken, the position of the young plant on the stolon, and the depth of planting of the young plant, attention being given to the yield in the first and in the second season after planting. The trials were so arranged that the results could be submitted to analysis of variance. The varieties used were Deutsch Evern, Jucunda and Madame Moutöt. The effect of time of planting was striking. The dates of planting were 15 July, end of August, and 15 March (or 1 April) in 1932 and 1933. The relation between the yields of the three varieties in the first season after planting was about 9: 3: 1 for Deutsch Evern, 3: 3: 1: 7: 1 for Jucunda, and 5: 6: 4: 1 for Madame Moutöt. In the second season the different times of planting had no differential effect on Jucunda and Madame Moutöt, but the March planting of Deutsch Evern gave results inferior to those of the other two varieties. The other three factors studied yielded no significant differences.

713. ANON. 588.427: 631.542
Passion fruit pruning, in relation to brown spot control.

Fruit World, Aust., 1945, 46: 11: 17.

Under favourable conditions passion vines rapidly produce much luxuriant growth, and this is the type of growth which carries the best and largest fruit. From it fresh growth (laterals) subsequently develop, resulting in the trellised vines becoming a very dense tangled mass of runners which may reach to the ground, and even run over part of the land between trellises. Such a dense vine is liable to severe brown spot infection (*Alternaria passiflorae*). The most practical way of pruning the vines is to slash off all pendulous growth to within 6 or 9 inches of the wires; a few days later any dead laterals can be quickly pulled off the wires and the remaining live portions of laterals can be further thinned out with secateurs or pruning knife. Pruning alone may effect appreciable control of brown spot infection, though better results are obtained if spraying with bordeaux mixture 6-4-50 after pruning is also practised, followed by monthly applications until the end of April, and then once every 6 or 8 weeks during the winter.

714. SNYDER, J. C. 634.8
Grape production in Washington on paying basis.
Better Fruit, 1946, 40: 8: 22, 27, 34-8.

Grape growing in Washington is on a relatively small scale with total plantings of about 6,000 acres, and the author offers reasons for increasing the acreage. The climate of this arid country is particularly suitable for grape growing and fungous diseases prevalent in humid grape growing areas are not a problem. In general the winter temperatures are milder than in any other American grape growing region of the temperate zones. Advice is given on the choice and preparation of the soil, green manuring and propagation. Sandy loams are ideal for grapes, they hold moisture and fertility well and are easy to work, but such soils usually require frequent irrigation and special attention to manuring; they have, however, a tendency to hasten maturity. Ryegrass, Austrian winter peas, and vetch have given excellent results as green manures in western and central Washington. Few plants are easier to propagate than grapevines, and hardwood cuttings made during the dormant season root readily without the addition of growth substances. Cuttings must be kept moist from the time of planting.

715. ANON. 634.1/8(79.4)
Fruit and nut tree acreage of California.
Calif. Citrogr., 1945, 30: 339.

The estimated bearing acreage for 1945 in California is specified for 25 fruit and nut tree kinds, the total amounting to 1,505,180. Grapevines head the list with an area of 493,580 acres, being followed by oranges 239,800, prunes 135,140 and walnuts 115,590. Other citrus figures are grapefruit 15,170 acres, lemons 65,850 and limes 760 acres.

SMALL FRUITS, VINES AND NUTS

16. KEMP, H. K. 634.873.4
 Currant investigations in the non-irrigated districts, 1932-1941.
J. Dep. Agric. S. Aust., 1942, 45: 355-60.
 Four centres, viz. McLaren Vale, the Adelaide Plains, Barossa Valley and Clare, were selected as representative of the non-irrigated vine districts of South Australia. The following problems were studied: (1) The renovation of old vines losing quality and cropping through debility. The vines were cut off about ground level, just above a point showing adventitious bud formation. From the very strong growth arising the vine head was reformed with a new framework system, the first crop being taken in the second year after beheading. A full crop may be expected in the third or fourth season. The yields obtained from rejuvenated vines warrant the general adoption of the treatment, since it was found that over a period of 5-7 years, including the first season, the reconstructed vines can be expected to outyield the old ones. Full tables of the results are published in a leaflet by the Department of Agriculture, Adelaide. (2) Pruning methods. In areas of great rainfall variability or of low rainfall, spur pruning appeared to be preferable to rod and spur pruning. In other areas there was no marked difference between the two methods. No advantage resulted from disbudding spur-pruned vines. (3) The manorial trials did not yield any conclusive results.—The experiments were carried out on the Zante currant by the Department of Agriculture in collaboration with the Commonwealth Viticultural Research Station, Merbein, and the Dried Fruits Board of South Australia.

17. POTAPOV, A. 634.8
 Growing grapes in the Province of Kharkov.
 [Russian.]
Social. Zemled. (Socialist Cultivation), 1945, No. 180, p. 2.
 Although the first vineyards in the province were planted in 1665, grapes have never been grown there on a commercial basis. Not more than 88 ha. were under vines at the state and collective farms of the province before the war. This area was reduced to 18 ha. during enemy occupation, and only 11.5 ha. were planted in 1945. At one collective farm record crop of 100 centners per ha. (from an area of 3 ha.) was harvested in 1944. For many years Mičurin varieties have been successfully grown in the province. The varieties Russian Concord and Green Sweet produced high yields, and the latter ripens early at the end of August. A special committee selected 20 hybrid vines as most suitable for the province. It is intended to plant 100 ha. with table grapes within the next two years. Such vineyards will be laid down on the collective farms in the vicinity of the city of Kharkov.

18. PEYER, E. 634.835.094
 Der Stand der Direktträgerfrage in der Schweiz.
 (The position as regards direct producers in Switzerland.)
Schweiz. Z. Obst- u. Weinb., 1945, 54: 118-24, 131-3.
 The author discusses the delicate direct producer problem in Switzerland in a paper read to a conference at Wädenswil in January 1945. His attitude is caution. While hybrid vines have become less objectionable from the point of view of *Phylloxera* infestation, since means of controlling the pest by winter spraying have been found, the quality problem remains and warrants limitation of new plantings. Hybrid grape utilization should be restricted to table grapes, production of alcohol-free grape juice and to wine production for home consumption.

19. LEYVRAZ, M. 634.8-1.541
 Das Anpflanzen von veredelten Reben als sog.
 "Long-Pieds." (The planting of budded vines on the long leg system.)
Schweiz. Z. Obst- u. Weinb., 1946, 55: 58-9.
 The so-called long leg system of vine grafting is rapidly gaining popularity with vine nurserymen in French Switzerland. At the time of budding the rootstock is cut to a height of 40-50 cm. This allows the future vine to be cut to its final height (25 cm. above the ground) in the first year and so saves time and leads to early cropping. Advantages and disadvantages are here discussed. It is not suitable for districts subject to severe winters.

720. LE ROUX, M. S., AND MALAN, A. H. 634.8-1.542
 Experiments on the topping of vines.
Fmg S. Afr., 1945, 20: 543-8, bibl. 5.
 The investigation was made in an Alphonse Lavallée vineyard in good vigour standing on the Bellevue Wine Experiment Farm, Stellenbosch. While in other countries even the lightest form of topping, viz. tipping, may have a harmful effect, the tipping treatment, entailing the removal of only the extreme growth tips of all shoots and sideshoots, was in these S. African trials found to improve the crop, both in quantity (37%) and quality. The operation was carried out 4 times: during the inflorescence stage, twice during the swelling period of the berries (about middle of November and beginning of December) and during the colouring stage. Severe topping had the effect of increasing yield, but it was associated with insufficient change of colour, delayed maturity and a gradual yield decrease in later phases of the experiment. In contrast, the grapes of tipped vines were well coloured and matured simultaneously with the controls. The trials, which were conducted from 1942 to 1945, are being continued.

721. STUDER, A. 634.51-1.541
 Greffage du noyer. (Grafting the walnut.)
Rev. hort. suisse, 1945, 18: 92-6.
 Points which may be of interest in this account of walnut rind grafting include the following: The scion having two eyes is cut with a pronounced shoulder, the pith being removed and only a long slender wedge-shaped strip remaining. On the outside or bark side of this strip a similar cut is made extending half its length and exposing the growth surfaces. It is just there that the junction with the stock is most secure. After introducing the scion beneath the bark of the stock the graftor drives 2 or 3 small pins in from each side. Firm contact between the apex of the stock and the scion may be assured by encircling a pair of scions with a strand of raffia drawn tight and knotted. Grafting wax is then applied carefully and the scion is entirely covered with it so as to keep it fresh. To avoid the wax running on hot days shade can be given by wrapping with corrugated or other strong paper and tying the whole with raffia. [By the use of bitumen wound sealing material all danger of running might perhaps be avoided.—Ed.]

722. LOUSTALOT, A. J. 634.521-1.432
 Influence of soil moisture conditions on apparent photosynthesis and transpiration of pecan leaves.
J. agric. Res., 1945, 71: 519-32, bibl. 12.
 The effects of both excessive and inadequate amounts of soil moisture on photosynthesis and transpiration of pecan leaves were determined on pecan seedlings growing in coarse sand and in heavy soil. In all instances both soil moisture extremes caused subnormal rates of photosynthesis and transpiration in the leaves. The amounts of reduction in the rates of photosynthesis and transpiration of leaves and pecan seedlings subjected to drought were closely correlated with the proximity of the soil moisture to the wilting point as well as with the atmospheric conditions during the critical period of moisture shortage. Under conditions highly favourable for moisture evaporation, as in the afternoons, photosynthesis almost ceased when the soil moisture was at the wilting point or slightly below; but the reduction in transpiration was considerably less. The rate of recovery in photosynthesis and transpiration activity from the effects of drought was usually very rapid during the first day or two after termination of the drought. A

substantial reduction in the rate of photosynthesis in leaves of pecan seedlings with submerged roots was observed 5 days after submersion, but no consistent and definite depression of transpiration occurred until several days later. The percentages of organic nitrogen and ash in tissues of seedlings subjected to flood conditions in sand for 35 days were considerably lower than in similar tissues of check plants. The results of these experiments emphasize the importance of good internal and surface drainage in pecan soils, in addition to an adequate moisture supply and a high moisture-holding capacity, and suggest possible causes of crop failures in orchards or groves in which the soils are subjected to drought or flood or to alternations of these conditions. [From author's summary.]

723. CUENOT, G. 634.55
Notes sur la classification des amandes. (Notes on the classification of almonds.)

Fruits Primeurs, 1945, 15: 225-32.

A useful classification of 125 almond varieties of Morocco. It is based on the texture and shape of shell and on the relation between the kernel and the rest of the nut.

724. MUSTAFA, A. M., AND JANJUA, N. A. 634.55
Almond growing in Baluchistan.

Ind. Fmg., 1942, 3: 539-42, 1 plate, reprinted *Punjab Fruit J.*, 1945, 9: 156-9.

There are but few regions in India where almonds can be successfully grown and one of these is the upland valleys of Baluchistan where wild almonds also grow profusely. The climatic requirements of the almond are so exacting that they limit its commercial production to specified areas. In most parts of the uplands of Baluchistan their limiting factor is the occurrence of early frost. It has been noticed that if the leaves of almond trees turn yellow and drop soon after the harvest the trees are generally unable to store enough

food materials for their normal requirements and the buds on such leaves cannot stand even light frosts. In Baluchistan the attempts of growers to prevent injury from frost by irrigation as a possible means of raising the temperature seems to be fairly effective. The heaviest yields are obtained when the soil is deep, fertile and well drained. Most of the soil in which the almond is planted in Baluchistan is heavy clay. It is common practice, provided sufficient water is available, to grow lucerne in between the trees in the early years. The presence of a good supply of organic matter in the soil is important, though very few growers in Baluchistan pay any attention to it. Almond trees can live from year to year under adverse moisture conditions, but it has been found that profitable crops can be got only by proper irrigation. With the exception of a very few choice varieties of almonds, which are generally budded, most of the almond trees planted in Baluchistan are from seedling stock [sic]. At the Fruit Experiment Station, Quetta, stocks such as apricots, peaches, and bitter almonds have been tried, and though the data so far collected are meagre, general experience has shown that the bitter almond is the best stock on which to bud under Baluchistan conditions. One of the chief reasons for failure is the self-sterility of many varieties. More than one variety must therefore be planted in the orchard. The most important pests of the almond in Baluchistan are briefly described. They are the green peach aphid (*Myzus persicae* Sulz.), black peach aphid (*Lachnus persicae* Cholodk.), buprestid borer (*Sphenoptera tappensis* Mass.), Quetta borer (*Aeolesthes sarta* Solsky), shot-hole borer (*Scolytus amygdali* Huer), and the almond scale (*Eriochiton amygdalae* Rao); there is a short note on their control.

725. TALBERT, T. J. 634.84
a Commercial grape growing in Missouri.
Bull. Mo. agric. Exp. Stat. 484, 1944, pp. 28.

PLANT PROTECTION OF DECIDUOUS FRUITS

726. FISH, S. 633/635-2.95
The Plant Research Laboratories, Burnley.

Wartime activities.

J. Dep. Agric. Vict., 1945, 43: 386-8.

During the war, the officers of the Plant Research Laboratory, Burnley, a Biological Branch of the Department of Agriculture of Victoria, devoted themselves to the control of flax diseases (chiefly wither tip and false browning), vegetable diseases such as carrot virus, of fruit diseases and of the insect pests of the above and other crops, further to legume seed inoculation with nitrogen-assimilating bacteria, to the commercial production of ergot and to the tropic deterioration of service equipment.

727. ANON. 633/635: 632.95
Pest and disease research.

Fruit World, Aust., 1944, 45: 5: 16-7.

This is an account of the advisory and research activities of the Plant Research Laboratory, Burnley, Victoria Department of Agriculture. Success is reported in combating apricot scab, brown rot and rust of peaches, summer black spot of pears, green peach aphid, codling moth of Williams pears, gooseberry weevil, and citrus red scale. A list is given of the officers at the station.

728. WESTERDIJK, J. 632.3/4(492)
50 jaar phytopathologie in Nederland. (Fifty years' phytopathology in the Netherlands.)

Tijdschr. PlZiekt., 1941, 47: 103-11.

This is a review of the development of plant pathology in Holland and of the work on plant diseases carried out by Dutch investigators during the last 50 years. The article is written on the 50th anniversary of the Netherlands Phytopathological Society.

729. MCCUBBIN, W. A. 632.9: 351.823.1
Preventing plant disease introduction.
Bot. Rev., 1946, 12: 101-39, bibl. 39.

The author discusses the subject with special reference to plant pathogens that have been introduced into the United States. He gives a long list of troublesome and destructive plant pathogens that entered the U.S. during the last century (chosen from an unpublished memorandum by J. A. Stevenson) and adds others introduced during the present century. The various ways by which diseases may enter a country are mentioned with reference to natural channels and introductions by human agency, and there is a discussion on prevention by natural barriers and by national effort in which the value of certification schemes and quarantines is stressed.

730. QUANIER, H. M. 632.3/4
Phytopathologische terminologie, met speciale besprekking van de begrippen biotrofie, premunitie en antistoffen. (Phytopathological terminology with special reference to the meaning of biotrophy, prematurity, and antibodies.) [English summary 1½ pp.]

Tijdschr. PlZiekt., 1942, 48: 1-16, bibl. 34.

This paper contains a list of phytopathological terms used by the author in his lectures. In general he agrees with Wilbrink and the Committee of Technical Words (*Phytopathology*, 30, pp. 363 and 365) submitting, however, some additions and corrections. In the author's list the English translations of the terms have been added. The principal additions and corrections concern the following terms: disposition, masking, biotrophy, perthotrophy, necrotrophy, thryptotrophic, mesotrophic, prematurity, premunization, subinfection, incubation, viruliferous, circulation period.

731. GARRETT, S. D., AND OTHERS. 631.4: 632.3/8

Soil-plant-disease relationships.*Soil Sci.*, 1946, 61: 1-109, bibl. 270.

A symposium "presenting an over-all picture of the problems involved in the control of plant disease organisms that harbor in the soil and the means employed by plant pathologists to control them". The authors, each an authority on his subject, were asked to give a review of the literature and to add their own results obtained since the publication of their last paper. The symposium is composed of the following papers:

(i) GARRETT, S. D.

Soil as a medium for transfer and multiplication of disease organisms, pp. 3-8, bibl. 21.

The principal subjects discussed are: The influence of soil factors on the root-infecting fungi. Soil inhabitants and soil invaders. Saprophytic and parasitic phases of root-infecting fungi.

(ii) SANFORD, G. B.

Soil-borne diseases in relation to the microflora associated with various crops and soil amendments, pp. 9-21, bibl. 39, being *Contr. Bot. Plant Path., Sci. Serv., Dep. Agric. Canada* 798.

Dealing with common scab of potato, potato stem canker, root rots of wheat and disease incidence in relation to rhizosphere effect.

(iii) WEINDLING, R.

Microbial antagonism and disease control, pp. 23-30, bibl. 12.

Scientific methods of controlling soil-borne pathogens biologically by means of microbial antagonism have still to be developed.

(iv) CHUFF, C.

Soil temperature, moisture, aeration, and pH as factors in disease incidence, pp. 31-6, bibl. 12.

(v) BEACH, W. S.

Pathogenic and physiogenic damping-off, pp. 37-46, bibl. 10, being *Pap. J. Ser. Pa agric. Exp. Stat. 1260*.

Physiogenic damping-off, the symptoms of which are often very similar to those of pathogenic damping-off, is due to non-parasitic diseases, such as burning-off or heat canker. The relative prevalence of the chief damping-off fungi of spinach, peas, tomatoes and beets in Pennsylvania in different seasons of the same year is set out in a table. Further, the effects of environmental factors and control measures are discussed.

(vi) WALKER, J. C.

Soil management and plant nutrition in relation to disease development, pp. 47-54, bibl. 24.

Fusarium wilt diseases; reaction of two distinct types of disease (hypoplastic in which toxic effects become manifest throughout the plant in advance of the parasite [cabbage yellows], and hyperplastic [=clubroot of cabbage] to nutrition in the same host; soil reaction. Summing up, the author concludes: "There is little basis to hope that, in the future, soil management and fertilization will solve any large percentage of the problems of plant disease control. There is, however, reason to believe that studies of host nutrition in relation to disease development may yield information on the basis of which modifications in soil practices may often be used to reduce the acuteness of disease losses."

(vii) DAINES, R. H.

Control of plant diseases by use of inorganic soil amendments, pp. 55-66, bibl. 37.

The materials discussed are: sulphur, liming materials, copper, mercury. The two former soil amendments have an indirect effect in that they influence the pH value, while the two latter offer fungicidal protection,

though with varying success. Under the heading "New developments" preliminary experiments are reported [apparently carried out by the author] with disodium ethylene bisdithiocarbamate, which was mixed with the soil. The results indicate that not only root diseases but also certain foliage diseases may be controlled in this manner. If, it is suggested, foliage diseases can be controlled by the use of soil amendments that are non-toxic to humans, a new approach to plant protection has been discovered.

(viii) NEWHALL, A. G.

Volatile soil fumigants for plant disease control, pp. 67-82, bibl. 14.

The need is stressed for a cheap method of eradicating pathogenic microorganisms, especially nematodes, from field soils, a need which promises to be met some day by the use of volatile fumigants injected beneath the surface. The requirements of the ideal soil fumigant are outlined, and methods of testing are described. Factors influencing the effectiveness of any given soil fumigant are discussed, with special reference to chloropicrin. Data on the nemacidal efficiency of several better-known soil fumigants are given, including chloropicrin, carbon disulfide, DD mixture, ethylene dichloride, and methyl bromide. The evolution of machinery designed for applying soil fumigants is outlined, and some of the unsolved problems in the field are mentioned. [Author's summary.]

(ix) JOHNSON, J.

Soil-steaming for disease control, pp. 83-91, bibl. 26.

Development of methods; diseases controlled by steaming; influence of steaming on soil and on plant growth (growth of microorganisms in heated soils, retardation of plant growth on steamed soils, the beneficial effects); methods of steaming.

(x) MCKINNEY, H. H.

Soil factors in relation to incidence and symptom-expression of virus diseases, pp. 93-100, bibl. 35.

(xi) KINCAID, R. R.

Soil factors affecting incidence of root knot, pp. 101-9, bibl. 42.

Soil factors affecting *Heterodera marioni* are temperature; moisture; sunlight; aeration; hydrogen-ion concentration; organic matter and biological control; soil fertility; flooding; fallow; movement and distribution of nematodes.

732. OSINGA, L.

634.1/7-2.6/7 Waarschuwingen voor ziektebestrijding in de fruitteelt. (Pest control warnings for fruit-growers.)*Meded. Direct. Tuinb.*, 1946, pp. 164-6.

The writer discusses methods of informing members of the N.P.V. (Nederlandsche Pomologische Vereeniging) when to take measures of control against certain pests, and what preparations to use. He concludes that the best and most certain way of imparting the information is by telegraph.

733. DE BARKER, G.

634.1/7-2.11 Stormschade bij fruitboomen. (Storm damage on fruit trees.)*Tijdschr. PlZiekt.*, 1944, 50: 45-7.

On 7 April, 1943, a strong north-east gale caused severe damage to fruit trees in Zeeland, Holland. The storm came at a most unfortunate time. Most plum and pear trees were almost in flower, some varieties already in bloom; the early-flowering apples were in the green-bud and pink-bud stages, but the buds of the late varieties were not yet expanded. Black currants had fairly well developed leaves and the inflorescences were showing. Gooseberries were already in full leaf and bloom. The damage according to

PLANT PROTECTION OF DECIDUOUS FRUITS

species affected was in the following order, the most severely damaged coming first: peach, cherry-plum (*Prunus cerasifera*), morello cherry, pear, apple, dessert plums, sweet cherries. The apple varieties specially sensitive were Manx Codlin, Jonathan and Gold Reinette; less sensitive was Peach-red Summerapple, in spite of its very early development. Of the pears the specially sensitive varieties were Comtesse de Paris, Louise Bonne d'Avranches, Triumph de Vienne and Conference.

734. POTTER, J. M. S. 634.1/7-2.111
 Simple precautions to assist in preventing frost damage to fruit crops in small gardens.
J. roy. hort. Soc., 1946, 71: 23-7, bibl. 2.

The suggestions made include: (1) Clean cultivation in spring. In the National Fruit Trials a few years ago one-half of a plum plot sown with a cover crop of *Trifolium incarnatum* bore practically no fruit as the result of an April frost, whereas a full crop was obtained from the other, clean cultivated half. (2) Judicious dressings of sulphate of ammonia or nitrate of potash in early spring following heavy fertilizer applications in later summer to encourage the development of strong foliage, which may screen the flowers from the clean sky. (3) An open frame to permit of free air passage. (4) Protective covering. (5) The planting of resistant or late flowering varieties, many of which are named, in localities subject to spring frosts. (6) The study of R. Bush's book, *Frost and the Fruit Grower* (*H.A.*, 15: 2064) and of Technical Communication 15 of this Bureau, *Spring frost damage in orchards and its possible prevention* (*H.A.*, 15: 2080).

735. BRYDEN, J. D., AND LINDSAY, E. J. 634.25-2.111
 Observations on frost injury in peaches at Bathurst Experiment Farm, season 1944-45.
Agric. Gaz. N.S.W., 1945, 56: 553-5.

Owing to frosts during blossoming and fruit setting, a considerable reduction in the peach crop occurred in the Bathurst district, New South Wales, in the 1944-45 season. Observations made in the area indicate that in the case of a prolonged period of exceptionally low temperatures, altitude is the dominant influence, as distinct from local height in relation to surroundings. Vigour and tree health were also found to have an important bearing on frost resistance. Trees which had received water and some form of manure during the previous season showed greater resistance than trees in less vigorous condition. No varietal difference in frost susceptibility was apparent.

736. ZOBRIST, L. 634.1/2-2.112
 Coups de soleil. (Sun damage phenomena).
Rev. hort. suisse, 1944, 17: 2-4.

Two exceptionally hot periods were experienced in Switzerland in the summer of 1943. In the first the maximum shade temperature at 4 p.m. rose gradually from 30°-0° C. on 28 July to 34°-5° C., degree of humidity 24% on 31 July, and did not drop below 34°-0 until 4 August. In the second it rose from 30°-0° C. on 16 August to 38°-0° C. on 19 August, degree of humidity 14%. In the damaged fruit, which must have been exposed to temperatures ranging from 48° to 55° C. in the sunshine, combined moreover with an intense luminosity, parts of the epidermis and adjacent tissues were killed. Browning occurred immediately after exposure. Several days later in the red-fruited apple varieties a brightly coloured ring became apparent round the dead areas. These areas dried up, while the rest of the undamaged tissues continued to grow normally. Whether lime-sulphur or copper or no spray had been used made no difference, but marked difference in varietal susceptibility was noticeable. Thus Bismarck, Yellow Bellefleur and Reinette de Landsberg were very badly damaged, while no damage at all was found on Ontario, Reinette de Champagne and Jonathan. Recent exposure by thinning and consequent exposure tended to

aggravate the damage. The phenomenon was rare in pears, prunes and gooseberries.

737. MULDER, D. 634.11-2.19
 Oude en nieuwe gegevens over de Stipziekte van de appel. (Old and new data on bitter pit in apples).
Tijdschr. PlZiekt., 1945, 51: 85-8.

This is a short general review of past and present theories as to the cause of bitter pit in apples. Assuming that it is a physiological disorder the author discusses briefly the influence of weather, soil, pruning, yield, time of picking, storage and packing.

738. ANET, M. 634.1/2-2.19: 546.27
 Le rôle du bore dans les accidents de végétation des arbres fruitiers. (The role of boron in faulty growth of fruit trees).
Rev. hort. suisse, 1944, 17: 249-55.

A discussion of the boron deficiency symptoms seen in many Swiss orchards and of the success attending attempts to cure them. The sale of borax for arboricultural use rose from 1,200 kg. in 1940 to 35,000 kg. in 1943 in the Valais district alone. Adequate control was achieved by applying 8 g. borax per square metre of orchard in the first year and 4 g. in subsequent years, which yearly amount in addition to complete manuring will, it is thought, prevent any recurrence of symptoms. These consist of the appearance of small leaves which form rosettes and die off with the branch in the course of the season. In the following year vigorous shoots are produced which later in the summer die back like the others. The fruits show all sorts of deformities, varying somewhat according to variety from cracks and splits to the formation of green protuberances and internal cork. The greater part of the article is devoted to a plea for the use, in the absence of adequate farmyard manure, of peat composted with cyanamide of lime, to which the requisite amounts of potash, phosphates, boron and other substances are added.

739. SMOLÁK, J. 634.11-2.19 + 2.3
 A contribution to our knowledge of water-core disease of apples.
Reprint Bull. Intern. Acad. Sci. Bohême, 1945, 54, 4 pp., 1 plate and 7 figs.

The author claims to have found bacteria in the intercellular spaces of apples affected with water-core or glassiness. He has not yet succeeded in infecting healthy apples except in one case where an apple showed a small watery area about 8 weeks after inoculation, but he believes that the bacteria present in the affected apples are not of a secondary nature and that water-core is bacteriosis.

740. VAN KOOT, Y. 632.8
 Viruszuivering en wat zij ons leert omtrent den aard van het virus. (The purification of viruses and the information it affords regarding their nature).
Tijdschr. PlZiekt., 1940, 46: 97-126, bibl. 46.

The first part is a survey of our present knowledge of purified viruses. In the second part three methods of purifying the ordinary tobacco mosaic virus and the single streak virus of the tomato are compared.

741. WILLISON, R. S. 634.22-2.8
 A line-pattern virosis of Shiro plum.
Phytopathology, 1945, 35: 991-1,001, bibl. 12.

A striking yellow to white line-pattern virosis, found originally on Shiro plum, has been transferred by budding to numerous species and varieties of the genus *Prunus*. On all susceptible hosts, symptoms consisted of linear markings in diversified patterns, such as rings, lines, bands, oak-leaf, and vein-banding. These patterns occurred on leaves produced in the spring, but persisted usually throughout the summer. Symptoms varied in intensity

nd extent on the same host from year to year, being more
tient when cool weather prevailed in the early part of
ie growing season. On peaches symptoms usually took
e form of pale green, irregular lines, rings, and vein-
anding. Faint green rings and lines and yellowish to white
atterns were found on the sweet cherry varieties, Black
artarian and Napoleon. On the sour cherry variety
ontmoresy, diffuse pale streaks, spots and rings appeared
i the first, and narrow, translucent lines in the second
ason after inoculation. Mahaleb seedlings showed green
ngs and lines, as well as short, yellow, later necrotic,
reaks along some of the main veins. [From author's
ummary.]

42. WILLISON, R. S., AND BERKELEY, G. H. 634.23-2.8

Tatter leaf of sweet cherry.

Phytopathology, 1946, 36: 73-84, bibl. 12.

tatter leaf of sweet cherry is a virus disease that has been
ound in several orchards of the Niagara Peninsula in
ntario. On peach the acute symptoms (slight superficial
ark necrosis, ring patterns, and chlorotic markings) appear
t the beginning of the first growing season after inoculation;
issequently, usually in the second year, chronic symptoms
pear including faint mosaic and oak-leaf patterns,
ullness and premature aging of the upper leaf surface,
ne red pin-spotting, and occasionally red rim, fawn
ecroses on leaves scattered over the tree. On Black
artarian cherry the first symptoms, in the spring after
oculation, are fine brown lines round interveinal areas
hich soon drop out; faint yellowish mottling and oak-leaf
atterns also occur. On the sour cherry variety Mont-
torency fine etched rings and necrotic spotting form the
cute phase, and undulations, rugosity and twisting of the
leaf laminae in the chronic phase. [From authors' summary.]

43. KRONENBERG, H. G. 634.75-2.8

Virusziekten in aardbeien. (Virus diseases of strawberries.)

Tijdschr. PIŽiekt., 1943, 49: 74-6.

his is a résumé of a lecture given by the author to the
etherlands Plant Pathological Society in November, 1942
t Amsterdam. The symptoms of xanthosis (yellow-edge),
rinkle and witch's broom are given. All three are mentioned
s occurring in Holland. Plants showing witch's broom
pear frequently, but they are generally soon removed
cause they are unfruitful. In order to test the varieties
nder cultivation in Holland for virus infection, Harris's
method of stolon-grafting has been adopted. It has been
ound that all commonly grown varieties are infected with
rinkle, e.g. Juncunda, Oberschlesien, and Frau Mieze
chindler.

44. HEWITT, W. B. 634.8-2.8

A graft-transmissible mosaic disease of grapevine.

Phytopathology, 1945, 35: 940-2.

n this disease, leaves of diseased vines show varying degrees
nd patterns of chlorosis consisting essentially of yellow,
ream, and light green areas. The cream chlorosis occurred
s a narrow band along the smaller veins, as irregular
lotches along the large veins, or as stippling or spattering
ver the leaf surface. Some leaves are entirely yellow
ith only traces of green along the large veins. The
ifferent patterns of mottling are shown in a plate. The
isease was found to be transmissible by budding.

45. RIKER, A. J., SPOERL, E., AND GUTSCHE, A. E.

632.3

**Some comparisons of bacterial plant galls and of
their causal agents.**

Bot. Rev., 1946, 12: 57-82, bibl. 101.

Comparisons have been made of nine bacterial plant gall
iseases, viz. beet pocket rot, cane gall, crown gall, Douglas
ir gall, *Gypsophila* gall, hairy root, oleander knot, olive
not and pear fasciation, as well as some similar non-
parasitic galls. The economic importance of these galls

has been great in some cases and small in others. The
fundamental similarity between plant and animal cells, and
the relative ease with which plant cells can be studied, have
suggested that a clarification of diseased growth in plants
would be helpful also in an understanding of similar conditions
in animals and human beings. Among the factors encouraging fundamental work with plants are large numbers,
low cost, suitable range of types, easy experimental manipulation,
pathological growths easily induced by micro-organisms and by non-parasitic agencies, genetic purity through pure lines or vegetative propagation, and cultivation *in vitro* on nutrients with known chemical formulae. Entrance by gall bacteria into the host is usually through wounds; their exit is apparently from the surface of living galls. Dissemination occurs in various common ways. Various bacteria progress through the tissue in several ways and form "secondary" galls as well as "tumor strands". The bacteria also travel with the open sap stream after entry through injured vessels, and form secondary galls when released into the surrounding tissue. More or less closely related to bacterial galls are various non-parasitic galls caused, for example, by wounds, grafts, accumulated food materials, genetic characteristics and certain chemicals including plant hormones. [From authors' summary.]

746. BOHN, G. W., AND MALOT, J. C. 634.721-2.3
Inoculation experiments with *Pseudomonas ribicola*.

Phytopathology, 1945, 35: 1008-16, bibl. 14.

Various methods of inoculating leaves of the golden currant (*Ribes aureum*) with *Pseudomonas ribicola* are described. Inoculations with moderately stiff brushes and with cotton pads rubbed on leaves dusted with 300-mesh carborundum yielded abundant infections, with symptoms similar to those of natural infections.

747. COOLEY, J. S. 634.1/7-2.4: 581.144.2
Root diseases of deciduous fruit trees.

Bot. Rev., 1946, 11: 83-100, bibl. 59.

This paper is a discussion of the present status of information on root diseases of deciduous fruit trees. The emphasis is placed on the diseases rather than on the pathogens and on the effect of various environmental factors on resistance and susceptibility. The diseases are described with reference to the following hosts: Apple: black root rot (*Xylaria mali*), white root rot (*Corticium galactinum*), *Phytophthora* root rot, crown gall (*Agrobacterium tumefaciens*), *Rosellinia* root rot, damping-off and collar disease (*Rhizoctonia solani*), collar blight (*Sclerotium rolfsii*), cotton root-rot fungus (*Phytophthora omnivorum*), *Armillaria* root rot, mushroom root rot (*Clitocybe tabescens*). Pear: black root rot, pear blight (*Erwinia amylovora*), crown gall, mushroom root rot. Cherry: *Armillaria* root rot. Peach, etc.: *Armillaria*, cotton root rot fungus, white root rot (*Corticium*), crown gall. Non-parasitic disorders are touched on, and there is a general discussion on remedial measures.

748. PRESTON, D. A. 632.3/4: 633/635(766)
Host index of Oklahoma plant diseases.

Tech. Bull. Okla. agric. Res. Stat. T-21, 1945,
pp. 168.

Over 100 pages are devoted to the host index arranged in alphabetical order and listing the pathogens under each genus or species. This order is reversed in the index to pathogens or causal agents, comprising 45 pages. Finally, an index is given to common names of hosts.

749. ANON. 632.3/4 + 632.8(944)
New plant diseases [in New South Wales].

Agric. Gaz. N.S.W., 1946, 47: 25-6.

The 36 plant diseases recorded for the first time in New South Wales during the period 1 May, 1944, to 30 November, 1945, include:—Yeasty rot of pineapple, beet sickness of beetroot, caused by *Aphanomyces* sp., mosaic of carrots, leaf mould of currant tomato, *Lycopersicum pimpinellifolium*,

PLANT PROTECTION OF DECIDUOUS FRUITS

caused by *Cladosporium fulvum*, powdery mildew of mango, caused by *Oidium* sp., root knot of trifoliate oranges, caused by *Heterodera marioni* and powdery mildew of choke, *Sechium edule*, caused by *Erysiphe cichoracearum*.

750. REED, G. M. 632.4
Physiologic specialization of the parasitic fungi.
II.

Bot. Rev., 1946, 12: 141-64, bibl. 177.

This supplement to a former article (*Bot. Rev.*, 1935, 1: 119-37) reviews the work during the last 10 years on physiologic specialization of parasitic fungi of crop plants. It deals chiefly with the rusts, smuts, and mildews of cereals, and only makes reference to a few fungi of plantation crops, i.e. *Bremia lactucae*, *Cladosporium fulvum*, *Phytophthora infestans*, and *Pseudoperonospora humuli*.

751. WESTON, W. A. R. D. 634.11-2.42
Apple scab.
Agriculture, 1945, 52: 551-3.

A clear description of the development of the disease accompanied by drawings showing at what stages spraying should be carried out.

752. VAN DE POL, P. H. 632.42: 634.11 + 634.13
Onderzoek naar het beste tijdstip der voorjaarsbespuiting tegen appel- en perenschorft. (*Venturia inaequalis* (Cke) Wint en *Venturia pirina* Ad.). I. Onderzoek te Wageningen. (An investigation of the best time for the spring spraying against apple and pear scab. I. An investigation at Wageningen.)

Tijdschr. PlZiekt., 1941, 47: 197-230, bibl. 37.

In Holland *Venturia inaequalis* and *V. pirina* overwinter in the perfect and in the imperfect stages. In the spring of 1941 stromata with ripe conidia were found on one-year-old apple twigs a month before the first ascospores were observed. Overwintered stromata are found only on apple and pear trees that are not regularly sprayed. Conidia may produce the first infections but, as the overwintered stromata are so few on the apple, the ascospores are more important for the spread of apple scab in spring. The variety of apple seems to have some effect on the course of ascospore dispersion. The peak time of ascospore liberation from leaves of Laxton's Superb in 1941 was one month earlier than from leaves of Signe Tillisch. When the ascospores become ripe the time of their dispersal depends on the weather, and a forecast of the weather at that period is necessary for scab control. The discharge of the ascospores depends on rainfall. Days when ascospores were observed in the absence of rain were exceptional. Leaves that from 13 May were artificially moistened daily continued to discharge ascospores for three days. Rain is equally important for the dispersal of conidia. In the years 1938-41 the stage of development of the blossom buds was no criterion for determining the time for spraying. In 1938 the peak of ascospore discharge coincided with the pink-bud stage of Belle de Boskoop, in 1939 with the green-bud stage, and in 1941 there had been considerable discharge before the mouse-ear stage. Rain has more influence on spore discharge than on spore development. On the other hand spore development and ripening is more dependent on temperature than is spore discharge. As the spores are ripening it is possible to foretell their discharge. Pieces of leaf with perithecia are moistened and examined daily and when ripe spores are found this is an indication that ripe perithecia are present. During the next fall of rain a discharge of spores can be expected.

753. GERSONS, L., AND OTHERS. 634.42: 634.11 + 634.13

Naar de beste tijdstippen der voorjaarsbespuiting tegen appel- en perenschorft. II. (On the best times for the spring spraying against apple and pear scab.)

Tijdschr. PlZiekt., 1942, 48: 33-60.

This is a continuation of the articles by P. H. van der Pol

(see previous abstract). The present contribution comprises reports by six other workers on their results of spraying against pear and apple scab in various parts of Holland. The general conclusions, drawn up by H. M. Quanjer, may be summarized as follows: The conidia on the young twigs are more important on pear than on apple. On pear twigs they are to be found before the ascospores are discharged. The ascospores are more important than the conidia. They are forcibly discharged upwards, they are smaller and lighter than the conidia, and are thus carried about in the air while the conidia are scattered downwards by rain. The first spraying should be timed so as to protect the young growth from infection by ascospores. As soon as the first perithecia are ripe (about the end of March or the first half of April) a shower of rain will cause the first discharge of a few ascospores, the "forerunners". Subsequent rainfall causes an increase in their numbers. There are some years (e.g. 1938 and 1940) when the first ascospore discharge corresponds with a very early stage in bud development and the first "high peak" of discharge with the "pink stage" in apples and the "white bud" stage in pears. In such years spraying according to bud development or to ascospore discharge would be immaterial. In other years (e.g. 1939 and 1941) a fortnight or more might elapse between the first high peak of discharge and blossoming. The ascospores both the forerunners and those of a high peak, are earlier than the trees. In such years the grower can expect better results from spraying according to the time of ascospore discharge than according to bud development, for the latter would be too late for good control.

754. ANON. 632.42: 634.11 + 634.13
Schurftbestrijding bij appel en peer. (Scab control on apple and pear.)

Tijdschr. PlZiekt., 1942, 48: 61-2.

This is a resume of an address by P. Hus at a meeting of the Netherlands Phytopathological Society, December, 1941. It embodies the findings mentioned in earlier papers (see Nos. 752, 753).

755. KIENHOLZ, J. R., AND CHILDS, L. 634.13-1.42
Fungicides in relation to scab and fruit russet of pear in the Hood River valley, Oregon.
Phytopathology, 1945, 35: 714-22, bibl. 8.

A spray material that is more effective against pear scab and less toxic to Anjou and other spray-sensitive pears has been needed to replace the wettable sulphurs now used because of the lack of better fungicides. A fungicide is often needed for scab control during the summer, but sulphur materials have four evident disadvantages for use on Anjou pears during that period. 1. They may cause a severe sun-scald type of injury on fruits when temperatures rise above 90° F. 2. Insecticides containing oil may not be applied within 45 days after sulphur fungicides on pear trees for fear of causing severe leaf-spotting or defoliation. This fact seriously hampers the control of late-season spider mite attacks in scabby orchards. 3. Sulphur is dissipated rapidly during warm weather and is effective in scab control for only relatively short periods. 4. Sulphur apparently is directly toxic to Anjou pear trees.

Lime-sulphur was the most satisfactory fungicide tested for pear scab control on those varieties not subject to scab injury. Copper phosphate has given equal or better scab control than wettable sulphur in most cases, and causes much less fruit russet during average weather conditions. During wet seasons it has not given adequate scab control and it has produced excessive fruit russet. The appearance of foliage sprayed with copper phosphate has been superior to that in any other spray plot. This material has not reduced fruit set and has been compatible with most insecticides. It has not been available during the war, and the mixture is so bulky that growers object to it. Ferman seems to be an immediate substitute for the wettable sulphurs for use on spray-sensitive pear varieties. It has

PLANT PROTECTION OF DECIDUOUS FRUITS

iven consistently good scab control and has not injured fruit for the past three years, and foliage colour has been excellent on sprayed trees. Fermate has given no trouble in most mixtures and oil may be safely used in the same application or soon afterwards.

56. TAYLOR, G. G. 634.11-2.4

Ripe spot on Sturmer apples. Field trials in Nelson for season 1943-44. Conclusions from use of bordeaux.

Orchard. N.Z., 1945, 18: 1: 2-3.

In a previous paper (*ibidem*, 1944, 17: 2: 3-5; *H.A.*, 14: 605) two applications of bordeaux mixture, one at 2-6-100 in mid-January and the other 1-4-100 in mid-February, plus casein wetting agent, was tentatively recommended for the control of ripe spot (*Neofabraea malicorticis*) of Sturmer apples in New Zealand. Further observations proved these recommendations to be justified and showed the superior keeping quality of treated fruit. In one instance, for example, only 7.1% sprayed apples had developed ripe spot by 25 July, all within commercial grade, as against 0.6% infection in the controls, of which 3.7% were minimum grade for ripe spot. The disease was found to develop early in storage life. Preliminary trials at the search orchard at Appleby indicate that bordeaux damage to the fruit may be eliminated by adding 6 pints of sulphite, a wetting agent, to 100 gallons of spray at the recommended strengths.

57. GROSJEAN, J. 632.47: 634.1/2

Het vraagstuk van de loodgloansziekte bij vruchtbomen. (The problem of silver leaf disease in fruit-trees.)

Tijdschr. PlZiek., 1943, 49: 172-8.

This article is mostly a general account of the silver leaf disease and its control, based on the work carried out in England by Brooks and his colleagues. Mention is made of some cultural experiments with *Stereum purpureum* from which it was shown that an extract of the bark of the alder poplar restrains the growth of the fungus in agar cultures.

58. SUTT, R. F. 634.711-2.42

Control of spur blight of red raspberries.

Bull. N. York agric. Exp. Stat. 710, pp. 14, bibl. 4. The control of spur blight of raspberries caused by *Didymella planata* and the relative susceptibility of some varieties to the disease were studied from 1938 to 1944 inclusive. It was observed that the fungus needs about 4-5 years to assume epidemic proportions in a new planting. Where proper horticultural methods are practised and the least susceptible varieties are planted, it cannot establish itself and requires no fungicidal treatment. When applied on the varieties Newburgh, Latham and Chief at the time the buds showed about $\frac{1}{2}$ in. green tissue, 1% Elgetol gave satisfactory control of the disease in combination with a 3-100 bordeaux spray applied when the new shoots were 0-12 in. high. On the variety Indian Summer excellent results were obtained with No. 604, 1-100 and $\frac{1}{2}$ -100, and ethane, 1-100, also proved very promising. Cover sprays for spur blight control should be directed towards the new shoots and should not be allowed to wet the fruiting canes more than necessary.

59. GHERSON, L. 634.75-2.48

A disease of *Fragaria* caused by *Fusarium orthoceras*.

Palestine J. Bot., (J), 1943, 3: 54-5.

In a Jerusalem garden, *Fusarium orthoceras* was isolated from diseased strawberry plants and from the soil in which they were growing. Inoculation experiments proved that the fungus was the cause of the disease.

760. KLINKENBERG, C. H. 634.75-2.411
Rood wortelrot van aardbeien. (The red core disease of strawberries.)

Meded. Direct. Tuinb., 1946, pp. 223-5, bibl. 10.

A review of the work carried out in Scotland, England, and the U.S.A. on the red core (red stele) disease of strawberries caused by *Phytophthora fragariae* Hickman.

761. DEMAREE, J. B. 634.75-2.4
Rhizoctonia bud rot of strawberry plants.

Phytopathology, 1945, 35: 710-3.

A bud-rot disease of strawberries caused by a *Rhizoctonia* of the *solanii* type, first reported by Brooks from Florida in 1935, was later found in Arkansas, Delaware, Maryland, Mississippi, North Carolina and Tennessee. The fungus attacks and kills the flower and leaf buds during a few weeks when buds resume new growth. The early symptoms of the disease are very similar to and can easily be mistaken in the field for some other strawberry disorders, namely injuries caused by the sucking insect *Orthea vincta* in Florida; the crown rot disease caused by *Sclerotinia sclerotiorum* in southern Louisiana; and spring dwarf, caused by the nematode *Aphelenchoides fragariae*.

762. SUTT, R. F. 634.723-2.42

Currant leaf spot control.

Bull. N. York agric. Exp. Stat. 709, 1945, pp. 13, bibl. 15.

About 85% of the currant leaf spot occurring in New York State is caused by *Pseudopeziza ribis* and 15% by *Mycosphaerella grossulariae*. Six years' experiments, in the course of which various concentrations of bordeaux mixture, 9 insoluble coppers, 3 organic fungicides, lime-sulphur and 8 spreaders were tested, showed that the best leaf spot control was obtained with 2 applications of a 3-3-100 bordeaux mixture with 1 pint of S.E.C. oil, made 3 weeks after bloom and immediately after picking respectively. At this concentration and in combination with a spreader the visible spray residue was reduced to a minimum.

763. WHITE, N. H. 634.723-2.4

Septoria leaf spot of currant.

Tasm. J. Agric., 1945, 16: 163-5.

During the past few seasons this disease, caused by *Septoria ribis*, has been severe on black currants in Southern Tasmania. In some crops in the 1943-44 season more than half the fruit was lost through this disease. Not only are the leaves infected and, in severe cases, fall early, but the ripening fruit shrivels because of direct infection of the fruit or by infection of the pedicels. The life history of the fungus is illustrated by drawings. Recommendations for control are: Spray with bordeaux mixture at 3: 3: 100 strength when the fruit is half-grown, and again at the same or twice the strength after the fruit has been picked. The heavier application (6: 6: 100) after picking may cause some premature leaf-fall, but this would not be harmful.

764. ANON. 632.951
Winter control of orchard insect pests.

Fruit World, Aust., 1944, 45: 5: 5.

Notes by the Biological Branch, Victoria Dept. of Agriculture, on the winter control measures against black cherry aphid (*Myzus cerasi*), green peach aphid (*Myzus persicae*), the Bryobia mite (*Bryobia praetiosa*), San José scale, and pear leaf blister mite.

765. DUNEGAN, J. C., AND ISELY, D. 634.11-2.754

Leafhopper ovipositions, the cause of one form of apple measles.

Phytopathology, 1945, 35: 870-6, bibl. 11.

It is concluded that the pustular type of apple measles disease is not a physiological trouble but is caused by the deposition of leafhopper eggs (*Typhlocyba pomaria*) in the twigs.

PLANT PROTECTION OF DECIDUOUS FRUITS

766. KUENEN, D. J. 632.654.2: 634.1/2
Spint op vruchtbomen. (Red spider on fruit trees.)
Tijdschr. PlZiek., 1943, 49: 130-1.

This is a résumé of a paper read at a meeting of the Netherlands Plant Pathological Society in March, 1943. It deals with the life-cycle of the fruit tree red spider, *Metatetranychus [Oligonychus] ulmi*, its relation to weather conditions and its control. It is stated that the commonly accepted notion that fruit-tree carbolineum kills the predators of the red spider and thus encourages red spider infestation is not wholly correct.

767. COTTIER, W. 634.723-2.654.2
Bud mite in black currants.
Orchard. N.Z., 1945, 18: 11: 7-8, bibl. 7.

The occurrence of bud mite in black currants, identified as *Phytopus ribis*, has been recorded in the Greystown district of New Zealand, but so far the pest does not appear to be of economic importance. Fortunately, the virus disease reversion, of which bud mite is the vector, is not present in New Zealand. The symptoms caused by the pest differ from those produced elsewhere in that no big buds have been observed. Infested buds are not enlarged, they either fail to produce shoots, or only weak and spindly growth emerges. The results of spraying trials, conducted at Greystown, indicate that a 1-40 lime-sulphur spray applied at the grape-bud stage is generally effective without causing any injury to the plant. In cases of severe infestation a concentration of 1-20 is recommended.

768. CLAUSEN, R. 634.75-2.654.2
Essai de lutte contre l'acarien du fraiseur. (Control of the *Tarsonemus pallidus* mite on strawberries.)
Rev. hort. suisse, 1943, 16: 23-31.

An account is given of methyl bromide disinfection of strawberry plants with diagrammatic illustrations of the apparatus and notes on difficulties encountered and overcome.

769. KEMP, H. K. 634.8-2.654.2
The grape vine mite (*Tenuipalpus phoenicus* Geij.).
J. Dep. Agric. S. Aust., 1941, 45: 181-2.

The grape vine mite, which is similar in appearance to the fruit tree red spider though very much smaller, caused scorching of vine leaves and darkening and roughing of bunch stems at Waikerie, South Australia. The pest had not been previously reported in the State. A spraying trial showed that a spring application of lime-sulphur (1 gal. to 70 gal.) when the shoots are 9-12 in. long, is the most effective control measure.

770. MENZEL, R. 634.835.034
Die Bekämpfung der Reblaus an Direktträger-
reben im Kanton Zürich. (*Phylloxera* control
on direct producers in the Canton of Zürich.)
Schweiz. Z. Obst- u. Weinb., 1945, 55: 94-6.

Spraying of direct producers with fruit tree carbolineum for *Phylloxera* control, discussed *ibidem*, 1945, 54: 60-4, 73-7 (H.A., 16: 163), was carried out in the Canton of Zürich in the spring of 1945. Not one leaf gall was found the following summer. Annual application should be made compulsory.

771. LEPIGRE, A. 634.1/2-2.752
La désinfection des fruits frais parasités par le
pou de San-José. (Disinfection of fresh fruit
parasitized by the San José scale.)
Fruits Primeurs, 1945, 15: 196-204.

The author describes experiments in which different kinds of fruit at varying stages of maturity were submitted to methyl bromide fumigation for definite periods of time and the effect noted on the scale insect and the fruit. The result of all treatments was death to the scale, but the effect on the fruit varied considerably. Thus in prunes, Methley, Italian, Beauty, Santa Rose, Ogden, Burbank and Wickson, the onset of maturity was considerably hastened by treatment the sensitivity to treatment in this respect being, however, almost precisely inverse to the natural order of precocity in those varieties. With apricots no premature ripening was induced, and ripening occurred at the same time treated and untreated lots. Treatment of apples again was successful as regards the scale, but had no appreciable effect on ripening or any deleterious effect. Comparable trials were made with HCN as fumigant. Scale mortality was equally complete, ripening was not affected and the process was very much cheaper. In the author's opinion the present French veto on HCN disinfection of prunes means, in effect, a veto on their successful export from Algeria.

772. LAMBERS, D. H. RIS. 634.11-2.753
De bloedvlekkenluis van appel, *Sappaphis devecta* (Wlk.). (The red-leaf aphid of apple.) [English summary, 4 pp.]
Tijdschr. PlZiek., 1945, 51: 57-72, bibl. 12.

The author concludes that the aphid which makes roll-galls on apple leaves is different in morphology from *Sappaphis crataegi* Klth. (= *Anuraphis crataegi* Kalt.) which makes similar galls on leaves of hawthorn (*Crataegus* sp.) and which migrates to carrot and allied *Umbelliferae*. The apple aphid should be named *Sappaphis devecta* Wlk. A 4-page description of the aphid and its biology are given in English. The paper is illustrated by a coloured plate to show the type of damage on apple leaves, and a number of drawings to show the morphology of the aphid.

773. HEY, G. L. 634.11-2.761
Apple blossom weevil and DDT.
Agriculture, 1946, 52: 554-7, bibl. 4.

In 1945, extensive trials with DDT preparations against a number of pests, including apple blossom weevil, were carried out in 10 commercial orchards in different countries. The tabulated data indicate that one application of water containing $\frac{1}{2}$ lb. DDT per 100 gallons gave satisfactory control when made at the breaking to burst stages of the buds. Incidentally, in two instances excellent control of apple capsid was obtained, DDT having been applied at the breaking stage and again later.

774. HUYSMANS, C. P. 634.11-2.76
Levenswijze, voorkomen in 1943 en bestrijding
van de appelbloesemsnuitskever (*Anthonomus*
pomorum L.). (The habits, occurrence in 1943
and control of the apple blossom weevil.)
Tijdschr. PlZiek., 1944, 50: 1-19, bibl. 16.

This is a description with illustrations of the apple blossom weevil, its life-cycle and distribution with special reference to the degree of infestation in various districts in Holland and the varieties of apples attacked. Control measures discussed under (1) shaking the trees to dislodge the weevils which are collected and destroyed, (2) collection and destruction of the capped blossoms, (3) trap-bands, (4) winter spraying, (5) spring spraying, (6) biological control. None of these measures appears to be wholly satisfactory.

775. VAN ASPEREN, K. 634.11-2.76
Levenswijze en bestrijdingsmogelijkheden van
de appelbloesemsnuitskever, *Anthonomus pomorum*
L. (Life-cycle and control of the apple blossom
weevil.)
Tijdschr. PlZiek., 1944, 50: 19-22.

Describes observations and experiments in the field laboratory at Wageningen. The article on the whole summarizes the results recorded by C. P. Huysmans in some number of the journal. (See previous abstract.)

776. BOVEY, P., AND MARTIN, H. 634.11-2.76-2.951
Les traitements d'hiver des arbres fruitiers et la
lutte contre l'anthonome du pommier. (Winter
treatment of fruit trees and the control of the apple
blossom weevil.)
Rev. hort. suisse, 1944, 17: 45-52.

Carbolineum and similar spray materials having been

PLANT PROTECTION OF DECIDUOUS FRUITS

arce during the war in Switzerland, proprietary dinitroresol washes such as Sandoline and Nicrol have been found give very nearly as good results. In addition, in the absence of both carbolineum and dinitroresol, spraying apple trees just before bud burst with 1% Gesarol was found result in a 77% diminution in caterpillar as compared with the control. Since Gesarol has also already proved its efficacy against the apple blossom weevil, fresh trials are proposed in which the possibility of eliminating winter ashes in certain cases and merely using Gesarol just before bud break is to be tested.

77. BOVEY, P. 632.76: 634.13
La lutte contre l'anthonome d'hiver du poirier.
(The pear weevil and its control.)

Publ. Stat. fed. Ess. vitic. arboric. Lausanne 329, 1943, pp. 10, also Rev. hort. suisse, 1943, 16: 187-96, bibl. 4.

The control of *Anthonomus pyri*, which must be carried out the adult stage, was studied for several years at Saxon and her places in French Switzerland. A pyrethrum soap solution and Gesarol (DDT) were used in the spraying tests. was found that the concentration of the former could be reduced from 10% to 5% without loss in efficacy and that the latter at 1% gave excellent control in the absence of aetting agent. Copious applications should be made immediately before or at the beginning of the period of egg laying, i.e. under local conditions from the 15th to 20th or at least 25th September. In heavily infested orchards the treatment should be repeated in the following two years, hereafter every two or three years. Light infestations, as a rule, can be controlled by repetitions every two or three years.

78. KRONENBERG, H. G. 634.75-2.76

Phyllobius urticae de Geer schadelijk aan aardbeien in Kennemerland. (*Phyllobius urticae* de Geer causing damage to strawberries in Kennemerland.)

Tijdschr. PlZiekt., 1941, 47: 186-93.

he larvae of the nettle weevil *Phyllobius urticae*, either alone with the larvae of *Othiorrhynchus sulcatus*, are very destructive to the roots of strawberries in Kennemerland. As a first measure of control growers are recommended to eradicate all nettles in the vicinity. Derris and pyrethrum are effective insecticides for use against the pest.

79. SCHNEIDER, F. 634.8-2.76

Schaden und Bekämpfung des Rebenfallkäfers.
(Damage caused by and control of the vine pest
Adoxus obscurus.)

Schweiz. Z. Obst- u. Weinb., 1945, 54: 411-4.

he damage caused to vine leaves and grapes by the beetle *Adoxus obscurus* in certain parts of Switzerland is described and illustrated. Control is by Gesarol (DDT) dust or arsenicals.

80. LATHROP, F. H., AND DIRKS, C. O. 634.11-2.77

Timing the seasonal cycles of insects: the emergence of *Rhagoletis pomonella*.

J. econ. Ent., 1945, 38: 330-4, bibl. 7.

Observations over 11 years have led to the working out of a formula by which spraying for the control of the apple fruit fly may be timed with reasonable accuracy. The formula based on temperature, rainfall and the date of petal fall.—Iaine Agricultural Experiment Station.

81. BOS, J. 632.78: 634.11

De wormstekigheid bij appel in Nederland.
(Coding moth damage to apples in Holland.)

Tijdschr. PlZiekt., 1942, 48: 73-85, bibl. 7.

In his studies of the coding moth, *Carpocapse* [*Cydia pomonella*], the author reports the dates of appearance of the moths in 1940 and 1941. Nearly 1% of the larvae were parasitized by *Pristomerus vulnerator*. In 1939 and 1940

comparatively few moths of the second generation appeared; it is inferred that the second generation is of little importance. The relation between the appearance of the moths and the temperature is shown graphically. Whether the caterpillars mature early or late in the autumn has no effect on the time of appearance of the moths the following summer. In 1939 more larvae were caught in bands close to the ground than in those higher up the stems.

782. EYER, J. R. 632.78

Solid baits for codling moth control.

J. econ. Ent., 1945, 38: 344-6, bibl. 2.

Certain solid baits for codling moth control, i.e. safrole, phenyl acetic acid, pyruvic acid and yeast were found to be very promising and to possess the following advantages over the standard fermenting cane syrup bait. They are highly selective, they are easier to operate and they are not affected by rains or high temperatures.—New Mexico Agricultural Experiment Station.

783. MICHELBACHER, A. E. 632.78: 634.51

Control of codling moth on walnuts: Progress report.

J. econ. Ent., 1945, 38: 347-55, bibl. 7.

The control of codling moth, which has become one of the most serious walnut pests in California, was studied at Linden, Calif., on the Payne variety during the years 1942 to 1944 inclusive. The two broods must be combated by two spray applications, the first of which has to be timed accurately, in the Linden area about 1 May, while the second may be made any time from about 18 May to about the end of June. Standard lead arsenate (3 lb.+1 lb. Delmo Z+0.5 pint liquid spreader and sticker+0.33 gal. neutral medium soluble oil per 100 gal.) was found to give good control of the pest without injuring the trees. However, the formula is not yet considered safe for general recommendation. Tests with D.D.T., from which exceptionally good results are reported, were not made until 1944. The use of the chemical seems to create an aphid problem, which was solved by applying nicotine dust. Later in the season bacterial blight injuries apparently aid the caterpillars in gaining entry into the nuts.

784. GERRITSEN, J. D. 634.23-2.78

Levenswijze en bestrijding van het kerzenmotje.

(The life-cycle and control of the cherry moth.)

Tijdschr. PlZiekt., 1943, 49: 119-23.

The cherry moth *Argyresthia ephippella* appears regularly in cherry orchards in the Betuwe province, Holland, and causes great loss of crop. In spraying trials the best results were obtained with 6% and 7½% fruit-tree carbolineum. Sprays containing arsenic, applied before flowering, gave indifferent results.

785. TEN HOUTEN, J. G. 634.726-2.793

Iets over de bestrijding van de besenbladwesp
(*Pteronus ribesii* Scop.). (Control of the gooseberry sawfly.)

Tijdschr. PlZiekt., 1940, 46: 146-50, bibl. 5.

Laboratory and field experiments are described for the control of the gooseberry sawfly, *Pteronus ribesii* Scop. [= *Nematus ribesii* Scop.], comparing the action of lead arsenate and derris, with 0.05% Igepon as spreader. Good results were recorded for derris in suspension (1 in 10,000 rotenone) and a derris dust (½% rotenone).

786. BOVEY, P.,* AND MARTINOLI, L. 632.793: 634.22

Les hoplocampes des prunes. (Plum sawflies.)

Privately printed in Switzerland, 1944(?), pp. 15, bibl. 6.

A review of papers on the biology and control of plum sawfly, *Hoplocampa minuta* and *H. flava*, and a report of experiments carried out by the authors at Saxon and

* Entomologist at the Station féd. d'Essais vitic. arboric. Lausanne.

PLANT PROTECTION OF DECIDUOUS FRUITS

Verscio near Locarno on the varieties Reine Claude d'Oullins and Burbank. At both localities a liberal application at petal fall of 1% Gesarol (DDT) plus 0.2% Geigy wetting agent reduced fruit spoilage from about 75% in the controls to 4.4-6%.

787. ANON. 634.1/2-2.692
Protection of trees against rabbits and hares.
Fruit World, Aust., 1945, 46: 7: 19.

The scarcity of galvanized and of black iron netting has made necessary the adoption of other means for protecting trees against rodents. The safest method is to provide wrappers for each tree. The best wrappers are made from pieces of inch-mesh netting formed in a cylinder around the trees. Spreaders—a couple of stakes—hold the wire out from the tree. Suitable wrapping materials are hessian or old sacking, newspapers, straw, rushes or cornstalks; one disadvantage of these is that they must be removed each spring, otherwise the ties may cut into the bark. Mixtures worth a trial for plastering on fruit trees are (a) 1 oz. bitter aloe, 1 lb. soap, 1 gal. water; (b) equal parts slaked lime and cow manure. An American linseed oil-sulphur mixture is also described.

788. FRIEDRICH, W. 632.693.2
Les souris dans les cultures et les maisons. Leur destruction. (Mice in the field and at home and their destruction.)

Rev. hort. suisse, 1943, 16: 247-52.

Mice are as much a curse in Switzerland as elsewhere, in particular *Arvicola terrestris* and different types of *Mus sylvaticus*, the former being obnoxious owing to its root eating habits, while the latter frequently attacks grain crops. Gassing their holes is not generally successful, but the use of bait carrots, potatoes, grain, etc., poisoned with thallium* is found very efficacious. An illustration shows a squad of men moving over a stretch of infested ground putting in position poisoned grain. Where the use of poison is undesirable an extract of *Scilla maritima* known as Kemika is used.

789. SINGH, S. A. 634.1/7-2.682
Bird nuisance in orchards.
Punjab Fruit J., 1945, 9: 165-8.

The most common and important birds, insects and other animals that visit the Punjab orchards are the common Indian house-crow, the Indian parrot, the common myna, blackbirds and warblers; honey-bees, wasps, squirrels, bats and rats. They have been noticed to cause considerable damage to fruits and fruit trees. Some fruits can be protected from the smaller birds by bagging. Dates and grapes ripen very well in bags and can be kept on the plants until mature. Other methods of protection from birds are discussed under (1) the use of explosives for scaring, (2) the planting of wild fruit trees (e.g. mulberry, fig, etc.) to attract the birds away from the orchard fruits, (3) the provision of drinking water in the vicinity of orchards.

790. LITZENBERGER, S. C., POST, A. H., AND BINGHAM, G. H. 632.954
Controlling broad-leaved annual and biennial weeds with Sinox.

Bull. Mont. agric. Exp. Stat. 430, 1945, pp. 18.

The suitability of Sinox (sodium dinitro-ortho-cresylate) for controlling weeds in a number of crops, including peas and flax, was tested in extensive trials, in which the chemical was applied with power sprayers. No permanent injury to the crops occurred. The optimum dosage for flax and peas was found to be 1 gal. Sinox plus 2 lb. of either ammonium sulphate, sodium bisulphite or monobasic ammonium phosphate in 100 gal. water applied at the rate of 80 gal. per acre. No spraying should be carried out before the crop has reached the height of about 3 in. or after bud formation. The weeds are most easily killed in the 3-7 leaf stage. With

* Obtainable in Switzerland as pâte Surux.

peas, yield increases of 173-264% are reported, in flax 0.19%. The boom used, its attachment to the sprayer and other equipment is described. The cost of treating one acre with Sinox is estimated at \$3.50-4.50.

791. GARMAN, P. 634.11-2.95
Further studies of apple spray schedule reduction.

J. econ. Ent., 1945, 38: 341-3.

It is the ambition of the Connecticut Agricultural Experiment Station to achieve commercial control of apple pests and diseases with a reduced schedule of spray applications. The crux of the problem seems to lie with the stickers, of which bentonite-skim milk, aluminium hydroxide gel and aluminium silicate gel plus oil are named as highly successful in reduced programmes for light to moderate infestations and infections, where Fermate is the fungicide. The data, which are presented in detail, hold out some promise that in normal years apple growers may without undue risk be able to reduce the number of spray applications, if not the amount of chemicals applied.

792. HANSEN, K. 632.95: 634.1/7
Prøve med Frugtraesprøjter samt med komb. Brand- og Frugtraesprøjter. (Trials with various apparatus for spraying fruit trees including combined fire engine cum spray.)

Beretn. Stat. Redskabsudv. 96, 1945, pp. 60.

Trials with various types of sprayers and fire engines were carried out by the State Implement Committee at Trolleminde, near Hillerød, Denmark, and in several orchards in the winter of 1942-43 and in the spring of 1944. With hand sprayers yield and pressure were determined at normal working speed, with motor engines the tests included determination of yield at various pressures and speeds and of fuel consumption. The Committee had appealed for the construction of a combined sprayer and fire engine, hand-worked or engine-driven, but none of the models presented by the manufacturing firms offered a satisfactory solution. Suggestions are made as to how the problem might be solved. The types of sprayer tested are described and illustrated and their performance is noted. Photographs show the distribution of the liquid in the jet at various distances from the nozzle.

793. TURNER, N. 632.95
The coverage factor in the application of dusts.

J. econ. Ent., 1945, 38: 359-64, bibl. 16.

Two probabilities are involved in the application of dusts to the field: (1) the probability of reaching the insects with an insecticide at all (coverage) and (2) the probability of killing the insect with the dose that hits it (dosage). These can be distinguished by properly-designed dosage-response experiments. Concentration of toxicant in the dust affects the probability of killing the insect. Of the factors which might affect coverage, concentration of toxicant and amount applied per acre were studied. Concentration affected coverage because variations in amount of diluent affected the electrostatic charge developed in the process of applying the dust. Amount per acre within the limits used (10 lb., 80 lb.) had little or no effect on coverage. In terms of efficiency, small amounts of higher concentration dusts were preferable to high amounts of low-concentration dusts. In reducing amount used per acre, less control is lost if fewer pounds of dust are applied, rather than the same number of pounds of a lower concentration—12.15.4. [Author's summary.]—Connecticut Agricultural Experiment Station.

794. GRAHAM, J. J. T. 632.951 + 632.952
Report on insecticides and fungicides.

J. Ass. off. agric. Chem. Wash., 1944, 27: 546-9, bibl. 6.

The report deals with the determination of Pyrethrin I pyrethrum powder by the mercury reduction method. It is recommended that "the value 1 ml. of 0.01M KIO_3 = 5·

PLANT PROTECTION OF DECIDUOUS FRUITS

ng. of Pyrethrin I be adopted as the factor in the mercury reduction method for Pyrethrin I in pyrethrum powder and extracts (first action)".

95. HOCKEY, J. F., PICKETT, A. D., AND NEARY, M. E. 634.1/7-2.45

Spray calendars for apples and pears suitable for Nova Scotia, 1946.

Eighty-second A.R. Nova Scotia Fruitgrs' Ass., 1945, pp. 82-4.

he ordinary schedule is supplemented by modifications for outbreaks of six special pests.

96. TAYLOR, G. G. 634.711-2.951/952

Experiments with spray treatments for control of diseases and pests of raspberries.

N.Z. J. Sci. Tech., 1945, 27, Sec. A, pp. 83-90, bibl. 1.

argely owing to diseases and pests, the per acre yield of asberries in the Nelson Province, New Zealand, has fallen from 2-2½ tons to 1-½ tons during the last 15 years. Spraying trials were conducted in two localities for two and three seasons respectively to determine the value of bordeaux mixture and lead arsenate against cane spot (*Elsinoe rubi*), septoria spot (*Septoria rubi*) and bud moth (*Carposina dreptella*). No attempt was made to evaluate the relative importance of fungus diseases and bud moth. During the first two years 7 and later 4 applications were made of a 4-50 or 3-4-50 bordeaux mixture and of lead arsenate, 1 lb. in 100 gal. Considerable increases in fruit yields and improved plant vigour were the result.

97. TAYLOR, G. G., AND ROBBINS, R. E. 634.711-2.95

Spraying experiments on raspberries. Five years' operation in Nelson District.

Orchard. N.Z., 1945, 18: 12: 3-7.

Five years' trials, carried out in commercial orchards, demonstrated the profitability of spraying raspberries under Nelson, New Zealand, conditions. The spray used was a combination of lead arsenate and bordeaux mixture, to diseases and pests to contend with being cane spot, septoria spot and bud moth. Concentration, number and rates of treatments are specified and yield increases are abulated.

98. SUTT, R. F., AND PALMITER, D. H. 634.725-2.4

Control of gooseberry diseases.

Bull. N. York St. agric. Exp. Stat. 711, 1945, pp. 22, bibl. 15.

In experiments conducted during the past 8 years, various concentrations of bordeaux mixture, 11 insoluble coppers, an organic fungicide, and 2 sulphur materials were tested for efficiency in control of powdery mildew, leaf spot (*Mycosphaerella grossulariae* and *Pseudopeziza ribis*), and rust of gooseberries. In general, the copper fungicides were better for leaf-spot control, while lime-sulphur was best against powdery mildew and rust. As a result of spray tests it was found that the most efficient control of powdery mildew was obtained with one application of lime-sulphur, 2-100, plus ½ pound of Spraysoy A. This application was made immediately after bloom. Copper fungicides gave satisfactory control most years but were not effective in dry seasons.—The best control of leaf spot was obtained with two applications of bordeaux mixture, 3-5-100, plus pint of S.E.C. oil. The first application was made about June, when leaf spot was first noticed, and the second usually immediately after the fruit was picked. Lime-sulphur did not control leaf spot.—Eradication of the alternate host of the gooseberry rust was the easiest and most economical way to control this disease. The sedge plants were removed or burned-over in the late fall or early spring. Spray tests have shown that for effective control of rust, three applications of lime-sulphur, 2-100, were required. The first application was made at the green-tip stage, the second

about 10 days later, and the third just before bloom. Powdery mildew and leaf spot were present in most gooseberry plantings. An application of lime-sulphur, 2-100, plus ½ pound of Spraysoy A, made immediately after bloom, followed by two applications of bordeaux mixture, 3-5-100, plus 1 pint of S.E.C. oil, the first about June and the second after harvest, gave excellent control of both diseases during the 3 years in which the programme was tested. [From authors' summary.]

99. SUTT, R. F. 634.8-2.4

Field results on the control of certain grape diseases in New York.

Bull. N. York St. agric. Exp. Stat. 712, pp. 26, bibl. 13.

Black rot, *Guignardia bidwellii*, downy mildew, *Plasmopara viticola*, and powdery mildew, *Uncinula necator*, are the most important diseases of grapes in New York State. The susceptibility to these diseases of the leaves and bunches of 11 varieties of grapes as observed under field conditions is recorded. Experiments were conducted from 1940 to 1944, inclusive, to determine economical spray schedules for their control. The results presented here showed that excellent control of downy mildew and powdery mildew was obtained with three applications (before bloom, immediately after bloom, and two weeks after bloom) of bordeaux mixture, 4-4-100, plus 1 lb. of rosin fish oil soap, provided the spray was applied so as to give coverage of the leaves and bunches. This schedule also controlled black rot in the tests conducted in 1940 and 1941. However, five applications of bordeaux mixture were necessary in the 1944 tests. If powdery mildew was the only disease present in the vineyard, excellent control was obtained with two applications (immediately after bloom and 10 to 14 days after bloom) of bordeaux mixture, 2-4-100, plus 1 lb. of rosin fish oil soap.—Seven insoluble coppers were tested for the control of the three diseases. Except in a few isolated cases these materials were not superior to bordeaux mixture.—Fermate, 2-100, appears very promising for the control of black rot. This fungicide gave better control of black rot than bordeaux mixture but was less effective than bordeaux for the control of downy mildew and did not control powdery mildew. An experimental organic material, U.S.R. No. 604, was better than bordeaux mixture for the control of downy mildew and equal to bordeaux mixture for the control of black rot. It caused some injury when used at a 1-100 concentration. [From author's summary.]

800. MILLER, P. W., AND SCHUSTER, C. E.

632.952: 634.51 + 634.54

Transpiration responses of Persian walnuts and filberts sprayed with bordeaux mixture.

J. agric. Res., 1945, 71: 465-9, bibl. 8, being Tech. Pap. Oreg. Exp. Stat. 422.

Uniform results were not obtained. The effect of a high-lime bordeaux mixture on the transpiration rate of Persian walnuts and filberts did not differ significantly from that of a low-lime bordeaux mixture.

801. PAGE, A. B. P., STRINGER, A., AND BLACKITH, R. E. 632.951

Investigation of insecticidal sprays.

Nature, 1946, 157: 80-1, bibl. 6.

The investigation is concerned with methods of toxicity determination of insecticidal sprays. Pyrethrins and a number of non-agricultural insect pests were used in the trials, which, it is hoped, will be extended to a wider range of materials and insects.—Imperial College, London.

802. DESHUSSES, J., AND DESHUSSES, L. 632.951

Toxicité des insecticides chez l'homme et les animaux à sang chaud. (Toxicity of insecticides to man and warm blooded animals.)

Rev. hort. suisse, 1945, 18: 223-30, 249-54.

A most interesting paper in which the various insecticides

PLANT PROTECTION OF DECIDUOUS FRUITS

are classed in various ways. Thus (1) they are classed according to their chemical composition, e.g. inorganic derivatives of arsenic, of phosphorus, of thallium, etc., or organic derivatives of ethers, HCN, etc. (2) They are classed according to their toxicity to different parts of the body, e.g. as poisons of the respiratory system or the blood, as irritants and as muscular or nerve poisons. Next the approximately lethal amounts of different poisons for man and different animals are stated with their authority. The symptoms of the different sorts of poisoning are described and methods of avoiding accidents are discussed with a note of common instances of carelessness which may lead to disaster. It is urged that short courses in toxicology should be given at rural schools so that those dealing with dangerous substances should be on their guard and in a position to act in case of emergency.

803. SHAW, H. 632.951
Some uses of D.D.T. in agriculture.

Nature, 1946, 157: 285-7.

This is an account of papers read, and subsequent discussions, on the use of DDT in relation to agricultural problems, at a meeting of the Association of Applied Biologists on 5 October, 1945. C. T. Gimingham stressed the need for further research before trying to assess the true value of DDT. A special problem in agriculture is the risk of its harmful effects upon beneficial insects. There appears to be little danger to warm-blooded animals, but more information is required about its cumulative effects. G. H. L. Dicker reported promising results against apple blossom weevil. M. Cohen described preliminary tests on the production of DDT "smokes" by burning impregnated filter paper. Other aspects of the use of DDT in agriculture (flies in farm buildings, sheep blowflies and sheep ticks) were discussed.

804. LEEFMANS, S. 632.951
Voorzichtigheid met DDT gewenscht. (DDT
should be used with caution.)

Meded. Direct. Tuinb., 1946, pp. 218-22.

The author criticizes a statement, in a report of an insecticide-congress held in London on 11 October, 1945, which asserts that DDT as dust is not injurious to man, nor in solution provided it does not come in contact with the human body. He collates information from American literature which provides evidence that DDT is not harmless to warm-blooded animals. He advises that DDT should be used with caution until more is known as to its toxicity to human beings and domestic animals.

805. WILSON, G. F. 632.951
D.D.T. Investigations on its effect upon some
horticultural pests.

J. roy. hort. Soc., 1946, 71: 6-13.

The results obtained at Wisley in 1944 and 1945 with D.D.T. dusts and liquid sprays in the form of emulsions are presented in general terms. In view of the impatience of the public to obtain supplies of the chemical the author's object is to assert that the new insecticide does not possess any "cure all" properties and to draw attention to its shortcomings. Among the latter are mentioned: It lacks both selective and ovicidal action, it acts too slowly on aphids to be effective, and it is useless against red spider and other acarine mites. The need for correct timing of applications at correct strength is emphasized so as to minimize damage to beneficial insects. The effect of D.D.T. on 31 garden pests and 3 household pests is recorded and the excellent control of mosquitoes in garden ponds is discussed in some detail.

806. BOYCE, A. M. (Organizer). 632.951
DDT symposium.

Calif. Citrogr., 1946, 31: 113, 126-7.

This article consists of summaries of reports presented by various members of the Entomological Club of Southern California at a recent symposium on the use of DDT against citrus pests and others. Promising results were reported

against red, purple, black, and citricola scales, greenish thrips, citrus thrips, and codling moth on apples and pears. For codling moth on walnuts an application of DDT was not superior to one of basic lead arsenate, and for husk flies on walnuts the DDT treatments showed no increase in effectiveness over the standard cryolite treatments. The application of DDT to citrus in areas infested with red spider mite has resulted in an increase in the spider mite population.

807. MACDONALD, G. 632.951

D.D.T.

Plant. Chron., 1946, 41: 9-11.

DDT is discussed with regard to its chemical characteristics, toxicity to man, toxicity to insects, dose, form in which applied, apparatus for distribution, place of application and frequency of spraying. DDT is poisonous to all insects though they vary greatly in their resistance to it. Some do not die from a dose only 1/1,000 of that needed to kill others. The poisonous effect is apparent even when only minute quantities of the dry powder come in contact with the insect's cuticle through which it is absorbed, and kills apparently by an effect on the insect's nervous system.

808. LEEFMANS, S. 632.952: 638.14

DDT en de bijenteelt. (DDT and apiculture.)

Meded. Direct. Tuinb., 1946, pp. 248-9.

This is a review of observations and trials on the effect of DDT on honey bees. Mention is made of field trials in which no noticeable damage to bees had been noticed after spraying cotton, alfalfa, potatoes and vetches with DDT. The author concludes that a warning against the general use of DDT is not superfluous and recommends that it should not be applied to fruit trees in bloom.

809. TAYLOR, G. G. 632.951

Preliminary field trials with D.D.T. and 666 against

insect pests.

N.Z. J. Sci. Tech., 1945, 27, Sec. A, pp. 129-33,
bibl. 1.

In exploratory field spraying trials D.D.T. gave excellent control of grass-grub (*Odontotarsus zealandicus*), apricots, carrot aphid (*Cavarilla aegopodii*), codling moth (*Cydia pomonella*) and white butterfly (*Pieris rapae*), while 666 was effective only against carrot aphid. Neither of the insecticides was toxic to red mite (*Paratetranychus pilosus* and *Bryobia praetiosa*) which increased after treatment with either.

810. SMITH, J. H. 632.951

A new insecticide—D.D.T.

Qd agric. J., 1945, 61: 216-20.

This article records promising results with D.D.T. against bean fly, green vegetable bug, beet webworm, potato tuber moth, cabbage moth, brown vegetable weevil, and potato and cotton jassids. Against the corn ear worm on crops such as sorghum, where the larvae must feed on treated parts of the plant surface, excellent kills have been obtained on other crops such as tomato and cotton, where the young larvae burrow into the flowers or fruits, the insecticide may be less effective. The results against the common aphids are very variable and seldom better than are already obtained with existing control measures. Against thrips too, the results are inconsistent. It is improbable that D.D.T. will be of any value for the control of red spider and other mites which attack cultivated crops. Actually, the mite position may be aggravated owing to the lethal action that D.D.T. has on some of the parasites and predators which help to keep pests of this kind in check. Existing methods of controlling mites should therefore not be altered. In Queensland, citrus is one of the few plants which have been injured by D.D.T. sprays applied at routine experimental strengths. The author concludes "Though it is probable that D.D.T. will prove to be less hazardous to both farmer and consumer than some other insecticides, it is poisonous and must be handled with

asonable care. On crops such as cabbages and lettuce, which the treated parts are used for food, treatment should be at least three weeks before harvesting begins. On potatoes, turnips, and carrots, as well as the several field crops, the residue problem is of no moment and does not influence the grower's pest control programme."

11. VORRIES, C. T., AND WEHRLE, L. P. 632.951
A "fog" or aerosol applicator for DDT.

Science, 1945, 102: 648.

Aerosol production of DDT on a field scale has been accomplished by adapting a naval fog generator to application of the insecticide in an oil fog.—Arizona Agricultural Experiment Station.

12. YEAGER, J. F., AND MUNSON, S. C. 632.951
Physiological evidence of a site of action of DDT in an insect.

Science, 1945, 102: 305-7.

The experiments were carried out with the cockroach, *Periplaneta americana*.

13. GONGGRIP, J. 632.951

Het mengen van minerale oliën en boomleurstoffen met kopermiddelen. (The combination of mineral oils and tar-distillates with copper preparations.)

Meded. Direct. Tuinb., 1946, pp. 227-34.

In early spraying against scab the grower is often tempted to combine it with a late winter spray. The first dispersion of ascospores of *Venturia inaequalis* is often so early that in order to protect the young flower buds a fungicidal spray is necessary at the time when oil emulsions and D.N.C.-containing washes are applied. Certain fruit growers have sprayed with oil, or with D.N.C., mixed with a copper preparation, mostly with satisfactory results. On the basis of experiments with such combinations the author advises, (1) In combining a winter spray containing D.N.C. with a copper preparation, copper-oxychloride should be used. (2) Oil-emulsion without D.N.C. can be combined with either bordeaux mixture or copper-oxychloride. (3) In mixing copper-oxychloride with oil-emulsion first dilute the copper-oxychloride; then dilute the oil-emulsion, stirring it with an equal volume of water and add this to the copper-oxychloride suspension, stirring vigorously. (4) D.N.C. preparations can, as a rule, be mixed with copper-oxychloride without any special precautions. (5) Do not be tempted to delay the application of these combined sprays too long. Spray at the latest at the mouse-ear stage on the early varieties and before the appearance of the first leaf aphids, otherwise there will be scorch and poor results against the aphids.

14. DIERICK, G. F. E. M. 632.951

De ovicidie werking van 3,5-dinitro-o-cresol. (The ovicidal action of 3,5-dinitro-o-cresol.)

Tijdschr. PlZiekt., 1943, 49: 22-32, bibl. 7.

The toxicity of dinitro-o-cresol solutions is to be attributed to the toxic action of the undissociated dinitro-o-cresol molecules. Since an acid solution of this substance contains many more undissociated acid molecules than an alkaline solution, its toxic action largely depends on the pH of the solution. There is a close relation between the amount of dinitro-o-cresol molecules present in solutions of different pH and its toxic action on flour-moth eggs and on plant lice. The high toxicity of these molecules is evident both in water solutions and when combined with mineral oils; in both cases the pH of the solution is an important factor. Probably no toxic action can be assigned to the dinitro-o-cresolate ions, nor to undissociated dinitro-o-cresolate molecules. Of the four alkaline salts of dinitro-o-cresol investigated, the ammonium salt is more toxic than the potassium, sodium and lithium salts, the toxicity of the last three being about equal. The high

toxicity of the ammonium salt is probably due to the action of the undissociated dinitro-o-cresol molecules.

815. SPOON, W. 632.951
Kwaliteitsomschrijving van derrispoeder. (The specification of derris powder.)

Tijdschr. PlZiekt., 1940, 46: 163-7.

For the standardization of derris powder the author gives the following specification: (a) the powder to be from the roots of species of the genus *Derris*; (b) moisture content at most 10%; (c) ash at most 8% calculated on the air-dried product; (d) fineness, 70 mesh (B30) (93—) 95%; 140 mesh (B50) (82—) 85%; 200 mesh (70—) 75%; (e) standard composition calculated on the air-dried product, rotenone 5% in (ether) extract 12-15%, 10% in (ether) extract 20-25%.

816. SPOON, W., AND LOOSJES, F. E. 632.951
Tienjaren derris-gebruik in Nederland. (Ten years' use of derris in Holland.)

Tijdschr. PlZiekt., 1941, 47: 130-44.

At the time this article was written derris had been used as a practical insecticide for 10 years. The pests against which it had proved successful are mentioned, and an account is given of the amounts of derris used in Holland during recent years.

817. JONES, M. A., AND COOPER, W. C. 632.951
The lack of scion effect on root quality of *Derris elliptica*.

Plant Physiol., 1946, 21: 63-7, bibl. 3.

Grafting between high- and low-rotenone varieties of *Derris elliptica* (Wall.) Benth. showed that there was no effect of top on roots so far as yield of root and percentage of rotenone were concerned. This indicates that the root system is not dependent on the top for a unique precursor of rotenone. [Authors' summary.]—Federal Experiment Station, Mayaguez, Puerto Rico, and Subtropical Fruit Field Station, Orlando, Florida.

818. FRANSSEN, J. J. 632.951
De gevoeligheid van zijderupsen voor derris-en pyrethrumstuifmengels. (The sensitiveness of the silkworm to derris and pyrethrum powders.)

Tijdschr. PlZiekt., 1943, 49: 126-9.

In order to determine whether the silkworm would serve as a test larva for biological investigations with insecticidal powders its sensitiveness to dusts containing derris and pyrethrum was tested. The results showed that for derris-containing dusts it was unsuitable because of its insensitivity to derris. For pyrethrum dusts it was more suitable but, compared with other larvae previously tested, its sensitiveness was not great.

819. ROBINSON, G. G. 632.951
The stability of rotenone in a phenol-oil solution.

Bull. ent. Res., 1944, 35: 1-2, bibl. 4.

A one-year-old phenol-oil solution of rotenone (1.5% wt/vol.) proved as toxic as a fresh solution.—London School of Hygiene and Tropical Medicine.

820. ALLEN, T. C., AND BRUNN, L. K. 632.951
Increased toxicity of lime-treated sabadilla seed in dust suspensions.

J. econ. Ent., 1945, 38: 291-3, bibl. 4.

The insecticidal activity of sabadilla dust extracted from sabadilla seed was found to be increased by heat or alkali treatment, preferably hydrated lime.—University of Wisconsin.

821. MUTINELLI, A. 632.951
Tephrosia noctiflora como planta insecticida. (Tephrosia noctiflora as an insecticide plant.)

Rev. argent. Agron., 1945, 12: 291-314, bibl. 11.

The roots and seeds of *Tephrosia noctiflora* Bojer were found to contain resins with high ictotoxic and insecticidal (by contact) properties. It is well adapted for cultivation

in the regions where the trials were carried out (Misiones, Argentina), and large-scale experiments are advised to determine whether it can be economically grown in that region, which is not suitable for the rotenone-producing plants.

822. ALLEN, T. C., AND OTHERS. 632.951
a The relative effectiveness of the principal alkaloids of sabadilla seed. *J. econ. Ent.*, 1945, 38: 293-6, bibl. 5.

b CAVALLITO, C. J., AND OTHERS. 632.953
Allicin, the antibacterial principle of *Allium sativum*. I. Isolation, physical properties and antibacterial action. *J. Amer. chem. Soc.*, 1944, 66: 1950-1, bibl. 10. II. Determination of the chemical structure. *Ibidem*, 1944, 66: 1952-4, bibl. 8.

c ECKERT, J. E. 632.951: 638.1
The effect of DDT on honey bees. *J. econ. Ent.*, 1945, 38: 369-74, bibl. 4.
Judicious application is urged.

d GESLIN, H. 632.111
Loi de la propagation du gel dans le sol en fonction de l'épaisseur de la couche de neige. (Frost penetration in the soil in relation to the depth of snow cover.) Reprinted from *C.R. Acad. Sci. Paris*, 1942, Séance 19.1.1942, pp. 124-5.

e GODARD, M. M. 631.436: 581.035
Radiation solaire et échauffement de la surface du sol. (Solar radiation and the heating of the soil.) Reprinted from *C.R. Acad. Sci. Paris*, 1944, 219: 624-6.

f HANF, M. 632.5
Keimung von Unkräutern unter verschiedenen Bedingungen im Boden. (The germination of weeds under a variety of soil conditions.) [English summary 1 p.] *Landw. Jahrb.*, 1943, 93: 169-259, bibl. 114.

g VON HOFSTEN, C. G. 632.954
Nyare rön rörande ogräsökämpandet. (Recent observations on weed control in Swedish agriculture.) [English summary ½ p.] *K. Lantbr. Akad. Tidskr. Stockh.*, 1945, 84: 180-91.

h KALMUS, H., AND KASSANIS, B. 632.8
The use of abrasives in the transmission of plant viruses. *Ann. appl. Biol.*, 1945, 32: 230-4, bibl. 12.

i KEMP, H. K., AND BEARE, J. A. 634.11-2.42
Black spot of apples. *Fruit World, Aust.*, 1945, 46: 6: 9-13.
See *H.A.*, 16: 1576.

j LEWIS, W. H., AND RICHARDS, A. G., Jr. 632.951
Non-toxicity of DDT on [animal] cells in cultures. *Science*, 1945, 102: 330-1.

k LITZENBERGER, S. C., POST, A. H., AND MORRIS, H. E. 632.5
Important perennial weeds in Montana. Their identification and control. *Bull. Mont. agric. Exp. Stat.* 426, 1945, pp. 45.

l ROY, D. N., AND GHOSH, S. M. 632.951
The mechanism of action of a contact insecticide. *Bull. ent. Res.*, 1944, 35: 161-70, bibl. 11.
Pyrethrum, tested on mosquitoes and flies.

m SCHNEIDER, F. 632.752
Die San José-Schildlaus im Südtirol. (The San José scale in south Tirol.) *Schweiz. Z. Obst- u. Weinb.*, 1946, 55: 50-6.
War conditions have aggravated the position.

n SCHUURMANS STEKHOVEN, J. H., Jr. 632.651.3
Algemene gezichtspunten aangaande het vraagstuk der plantenaltjes. (A general survey of plant eelworms.) *Tijdschr. PlZiekt.*, 1941, 47: 1-13.

o STARR, D. F., BAKER, E. W., AND RAMIREZ, J. A. 632.944
A dispenser for methyl bromide and methyl bromide-DDT aerosols. *J. econ. Ent.*, 1945, 38: 401.

VEGETABLE, RUBBER

AND OTHER PLANTS.

823. WARNE, L. G. G. 635.1/7

Vegetable growing and research.

J. roy. hort. Soc., 1946, 71: 75-9, 105-8, 134-7.

The urgent need for more vegetable research is convincingly pleaded. Since the establishment of horticultural research stations in England "horticultural research", apart from glasshouse crops, has become almost synonymous with "fruit research". In the author's view, the 1934-38 British vegetable production of approximately 2½ million tons could be doubled without causing over-production, provided certain requirements were fulfilled. Pre-war and wartime increases in the supply of home-grown vegetables have been achieved without the aid of organized research. On the whole, vegetable culture still follows traditional methods and it cannot be said that many present-day practices, which differ so little from those of earlier periods, are in any way based on scientific fact. The first necessity is a detailed survey of the accepted methods of cultivation of the commoner vegetables, there being hardly a point on which unanimity prevails, even amongst progressive growers. The many problems cited as urgently requiring scientific investigation include the following: Is frequent inter-row cultivation beneficial, apart from its effectiveness in controlling weeds? This question is of particular importance where selective herbicides are applied for weed control.—What is the optimal spacing for a given crop?—What are the light and temperature requirements of the different

varieties of different vegetables?—How can vernalization be applied to seed production?—Can the dormancy of certain perennial crops be broken or prolonged by artificial means, substituting low or high temperature requirements?—Can the pollination stimulus be substituted by a synthetic hormone stimulus in vegetables grown for their fruit when the seed is unnecessary, for instance in types of *Phaseolus* eaten green?—What are the possibilities of using artificially produced polyploids in vegetable breeding?—Great importance is attached to the study of transport, marketing and storage methods. The optimum levels of temperature and the optimum atmospheric composition inside car loads of vegetables, for instance, are quite unknown.—Suggestions made include the formation of a vegetable synonym committee, on whose recommendations a uniform nomenclature of varieties could be based, and the introduction of a Standard (or Trade) association sealing system for vegetable seeds which would guarantee the correct description of seeds offered for sale.—The author speculates on possible future developments. As an economic way to overcome the difficulty of organic manure shortage he envisages vegetable growing in light sandy soils, "draining freely, capable of being cultivated easily at all seasons, and whose physical condition is due to soil particle size rather than organic matter content. In these soils the free working properties do not depend on continued application of bulk organic manures but are an attribute of the mineral soil".

If. Controlled irrigation with nutrient solution would
ply water and mineral salts. That is, we should have
d or gravel culture not in specially prepared beds but in
ularly occurring sandy soils."

DOERY, A. C. 635.1/7(945)
Vegetable growing on the Koo-wee-rup Swamp.

J. Dep. Agric. Vict., 1945, 43: 429-38.

Koo-wee-rup Swamp, an area of approximately 100,000
es of high soil fertility and with an average of 30 in. of
nfall evenly distributed throughout the year, located in
psland within 50 miles of Melbourne, came into its own
uring the war, when it took to large-scale vegetable growing.
tivation of the following crops is described, varieties to
local conditions being named:—Carrots, beetroot,
snips, cabbages, onions, peas and maize.

ANON. 633/635: 551.566.3

A description of the products, soils, and climate
of the Narym Station [Siberia]. [Russian.]
*Sci. Rep. of the Narym State Plant Breeding
Station for 1941-1942*, pp. 5-8, Moscow, 1944.

ong the activities of this station are the breeding,
tivation, and seed production of vegetables and small
ts. Tobacco and kok saghyz are also being introduced.
e following rotation of crops is observed: (1) Cabbage
inured with dung, (2) potatoes, (3) onions, cucumbers,
atoes (application of dung), (4) root crops, (5) potatoes.

ANON. 633/635: 551.566.3

Plant breeding and seed production [in regions of
short summers]. [Russian.]

*Sci. Rep. of the Narym State Plant Breeding
Station for 1941-1942*, 1944, pp. 49-49.

he risk of sudden frost in spring and autumn and the short
mmer, are the two main obstacles to the cultivation of
getables and tree and bush fruits in the Narym region.
he present article describes and explains the methods of
eeding, seed production, and grafting which are being
veloped at the Station. Tomatoes have been successfully
own in the open, yielding at the rate of 600 cent. per ha.,
which 10-15% were red and 50-60% nearly red. A
ethod is being devised for avoiding the use of stakes and
ing, in order to facilitate horse-hoeing. Experiments in
rafting tomatoes on potatoes and other *Solanum* species
e described. The storage and vernalization of potato
es are explained. Cucumbers and their seed have been
roduced at the station; seedlings, when in the 3-leaf stage,
ere transplanted from frames to the field, or directly to the
eld; and the cucumbers were finally ripened off indoors.
onion varieties have been found which produce bulbs,
ring greens, and seed. Garlic can also be grown in the
arym region and keeps better than onions. Much
ention has been given to root crops, especially to the
roduction of their seed. Insect pests are a danger which
can be avoided by sowing seeds late in spring (about June).
arrots, table beet, swedes, turnips, and radishes are all
eing investigated. Small roots of beet yield more seed
an do large, and the seed ripens and germinates sooner.
ipening can also be hastened by slightly undercutting the
ots. The roots of carrots and beet can be satisfactorily
ored in snow. The wild Siberian apple is noted as a stock
n which to graft many varieties of cultivated apple. Rasp-
berries, black currants, gooseberries, strawberries, cherries,
lums, pears, nuts, *Amelanchier* sp., *Hypophaea* sp. and vines,
re all being studied in order to supplement the wild fruits
nd berries on which the local population still relies.
ornamental plants are also being investigated.

IVANOV, H. N. (Editor). 635.1/7: 631.531

Agricultural information on seed production of
vegetables and cucurbits. [Russian.]

State Publication of Rural Economy, Moscow,
1944, 108 pp.

After an introduction there is a short chapter on soil treat-
ment and general cultivation of vegetables. The following

crops are then discussed with special reference to the
production of seed: cucumber, tomato, egg plant, pepper,
peas and beans, lettuce, spinach, fennel, cabbage, brussels
sprouts, kohlrabi, cauliflower, root crops for domestic use
(beetroot, carrot, parsnip, turnip, radish, rape),
onion and cucurbits (water-melon, melon, pumpkin). The
chief diseases and pests of these crops are briefly described.

828. EDELJSTEIN, V. I. 581.14: 635.1/7
Some factors determining the yield of vegetable
crops. [Russian.]

Proc. Sci. Conf. Timirjazev Agric. Acad., 3-10 June,
1944, 1945, No. 1, pp. 38-40.

Among the factors considered is the area of the leaf surface.
This increases more quickly in the *Cucurbitaceae* than in
onions and root crops. It is smallest in spring, when solar
energy, temperature, and moisture are at their highest, and
largest in autumn, when they are at their lowest. The
second factor is the position on the plant where the seed is
formed; the third is the size of the seeds; the fourth is the
freezing of seed; the fifth is the choice of seedlings for
transplanting. It is shown how adequate attention to these
factors results in larger yields.

829. MERRY, D. M. 635.1/7: 631.544
Early cropping in Nelson.
N.Z. J. Agric., 1945, 71: 151-4.

Nelson's early cropping land lies along the foothills of a
relatively low mountain range forming the eastern boundary
to the Waimea Plain. It is this area, favoured by a mild
climate and suitable soil, which supplies New Zealand with
out-of-season peas and potatoes.

830. DOYER, L. C. 635.1/7: 631.531: 632.4
De betekenis van het zaad als overbrenger van
ziekten en plagen in groentegewassen. (The
importance of seed in the transmission of diseases
and pests of vegetables.)
Tijdschr. PlZiekt., 1941, 47: 14-23, bibl. 17,
3 plates.

The author discusses the parasitic fungi carried on the seed
of peas, beans, carrot, spinach, onion, beetroot, scorzonera,
celery and parsley, cabbage, and lettuce; also pests of pea,
and bean.

831. NOORDAM, D. (Jr.). 632.8: 635.1/9
Over het voorkomen van "spotted wilt" in the
Netherlands. (Spotted wilt in Holland.)
Tijdschr. PlZiekt., 1943, 49: 117-9.

The author reviews previous records of the probable
occurrence of spotted wilt (*Lycopersicum virus 3*) on gloxinia,
begonia, and tomato. He reports finding it on *Richardia
africana*, and describes experiments by which it was trans-
mitted to a number of other greenhouse plants.

832. STEINER, G. 632.651.3
Meadow nematodes as the cause of root destruction.
Phytopathology, 1945, 35: 935-7, bibl. 4.

The meadow nematodes, of the genus *Pratylenchus* Filipjev,
are one of the most important primary factors in root
destruction among cultivated and uncultivated plants. Not
only roots but also bulbs, corms, tubers, rhizomes, and, in
rare cases, even basal portions of stems appear subject to
attack. The damage to roots causes reduced growth of the
plants, wilting during the hot part of the day, and dying of
branches. Various root crops are liable to disfigurement,
particularly potatoes, peanuts and lily bulbs.

833. MORRISON, H. E., MOTE, D. C., AND LUNDE,
R. N. 632.944: 631.462
The use of a "rototiller" for application of soil
fumigants.

J. econ. Ent., 1945, 43: 409, being *Tech. Pap. Ore.
agric. Exp. Stat.* 458.

A rototiller was equipped with a small petrol motor and air
compressor, which was used to atomize fumigants into the
soil in the same manner as the ordinary paint sprayer.

Applications were made immediately behind the rototiller tines, so that preparation of the seed bed and sterilization of the soil were carried out in a single operation. The encouraging results show that satisfactory symphylid control may be obtained with soil sterilizing agents applied at half the normal rate. Rototilling without the additional application of fumigants was found to increase yields in soils heavily infested with symphylids without reducing the pest population. Apparently, the symphylids were thoroughly scattered throughout the plot and the plants had time to develop a good root system.

834. JACKS, H. 632.651.3: 632.944
Soil disinfection. III. Chemical treatments for eelworm control.

N.Z. J. Sci. Tech., 1945, 27, Sec. A, pp. 93-7, bibl. 1.

A number of chemicals were tested for their value in eelworm control, tomato seedlings growing in glasshouse boxes of standard potting soil serving as test plants. Best results were obtained with chloropicrin and Shell D-D, applied at the rate of 2.7 ml. per cubic foot. Chloropicrin treatment brought about increased plant growth in addition to its action on eelworms.

835. HADORN, C. 632.944
La désinfection des terres et terreaux destinés aux cultures maraîchères et horticoles. (The disinfection of horticultural soils.)

Rev. hort. suisse, 1945, 18: 45-8.

A discussion of the soil organisms, both animal and vegetable and how their natural harmonious existence is upset by man, especially the market gardener, is followed by an account of the methods available for restoring the balance, or at least eliminating the harmful ones. They are of three distinct types, namely:—1. *Biological*. These consist of avoiding, eliminating or lessening the damage done by harmful soil organisms by the use of appropriate cultivation methods, fallowing, trap plants, selection of resistant varieties or those favouring the enemies of the noxious organisms. The results are disappointing and temporary. 2. *Physical or mechanical*. Such as flooding (e.g. as for phylloxera), heat dry or wet (boiling water), steam. 3. *Chemical*. The chemicals discussed are sulphur, thiocarbonate of potash, HCN, lime, sublimate, copper salts, carbon bisulphide, mercury compounds such as the proprietary Céretan, formalin and various proprietary products.

836. TINCKER, M. A. H. 632.954
Tests made at Wisley with a selective weedkiller, Methoxone.

J. roy. hort. Soc., 1946, 71: 141-7, bibl. 8.

The name Methoxone has been applied to the methyl derivative of phenoxyacetic acid, though the substance may be marketed as Agrozine. The value of the chemical as a selective weedkiller in cereal crops has been shown previously. It was the object of the present investigation, which was carried out at Wisley in 1945, to test Methoxone from a horticultural point of view. A large number of weeds were sprayed and dusted under various conditions and their response to the treatment is tabulated in some detail. The value of the chemical in the vegetable garden is very limited, as it was found to be injurious to the crops, particularly to brassicas. It may, however, be successfully applied to lawns, grasses being highly resistant, whilst some rosette weeds are not. The superficial damage caused to some cultivated shrubs appeared to be slight. As the result of these trials the conclusion is drawn that for the time being sodium chlorate will continue to hold its place as a selective garden weedkiller.

837. GUBIN, A. F. 633.52: 581.162.3
Pollination of fibre flax by bees. [Russian.]

Proc. Lenin Acad. agric. Sci. U.S.S.R., 1942, Nos. 3-4, pp. 30-2.

The tabulated data of observations made by the author in

the neighbourhood of Moscow show that, although flax is largely wind-pollinated, the visits of insects result in further pollination and increase the yield of seeds, in number 4.7% and in weight by 7.1%.

838. TIVER, N. S. 633.52
Fibre development within the flax stem.

J. Dep. Agric. S. Aust., 1942, 45: 497-500.

Liral Crown flax was grown in 1941 under control conditions, the plants receiving two different moist treatments, (a) adequate moisture, and (b) artificial drought commenced at, and continued after, flowering. The plants were sown in pots on 6 May, 1941, and were harvested in 8 successive stages between 18 June and 31 October. Plants grown with an adequate water supply reached their maximum fibre content about 7 October, when they exhibited all the symptoms generally regarded as indicative of maturity. Plants subjected to partial drought after flowering were found to produce a lower percentage weight of fibre than plants supplied with adequate moisture. The anatomy of the flax stem is discussed.—Waite Agricultural Research Institute.

839. PEIVE, Y. V. 633.52-1.811.9: 546.27
Upper bog-peat and ashes as substitutes for boron fertilizers in flax cultivation. [Russian.]

Proc. Lenin Acad. agric. Sci. U.S.S.R., 1942, Nos. 3-4, pp. 26-9, bibl. 10.

Rooted, finely divided bog-peat may be applied directly to flax crops on the dark neutral soils, as a substitute for boron fertilizers. It is said to protect flax plants from a disease caused by bacteria, and it is quickly converted into mineral compounds. Wood ashes contain, in addition to potash, phosphates and lime, boron in amounts of 0.07%. Experiments have shown that wood ashes with suitable amounts of potash may serve as a complete substitute for boron and mineral fertilizers.

840. EARL, L. 633.52-1.55
Harvesting linen flax. Improvement in handling.

N.Z. J. Agric., 1946, 72: 51-6.

Because of indifferent weather at the time of harvesting flax in recent years (particularly 1944-45) measures taken to hasten the crop pulled, stooked and stacked in the shortest possible time have resulted in a good deal of rough handling. Great efficiency in handling is necessary, and it is pointed out how this can be achieved, with special reference to barting the crop. The construction of the bart is described in detail and illustrations show the steps in building it.

841. LOUGHNANE, J. B. 633.52-2.4
A seedling disease of flax caused by *Macrosporium* sp.

Nature, 1946, 157: 266.

Flax seed of a dull colour was found to give rise to diseased seedlings on which a *Macrosporium* developed. In inoculation experiments the fungus, which appears to be one not previously described, proved to be able to infect flax seedlings.

842. SPOON, W. 633.52-2.73
Stuiven en sputten met derris tegen de vlasthrips. (Dusting and spraying against the flax thrips.)

Tijdschr. PlZiekt., 1940, 46: 157-62.

Records good results against the flax thrips with derris, particularly with a dust containing 1% rotenone applied twice, the first time (22 May) at the rate of 25 kg. per ha. and the second time (26 May) at 50 kg. per ha.

843. RAW, A. R. 632.954: 633.52
Weed control in agricultural crops. Selective spray trials.

J. Dep. Agric. Vict., 1945, 43: 439-42.

Results of exploratory trials obtained at the State Research Farm, Werribee, and elsewhere in Victoria indicate the value of dinitro ortho cresylate as a selective weedkiller.

VEGETABLE, RUBBER AND OTHER PLANTS

seed and flax crops. The spray concentration successfully used without damage to the main crop was 1·25% oilied at the rate of 100 gal. per acre. The addition of sulphate of ammonia per gallon increased effectiveness, was found to be injurious to flax. Further studies are uired before general recommendations can be issued.

4. DUNIN-BARKOVSKI, V. H. 633.524
The wild kendir, its use and preservation. [Russian.]
Publ. All-Russian Society for the Preservation of Nature, Moscow, 1941, 176 pp., bibl. 198, 34 figs.
 The wild kendir (*Apocynum sibiricum* and *A. venetum*), its tribution in Central Asia, and the conditions under which grows, are described. On the basis of testing various ns and of microscopic examination of the fibres, kendir found to be of good quality by reason of its mechanical ability and structure, and it is considered suitable for ps' tackle.

5. CRANE, J. C., AND ACUÑA, J. B. 633.524.3
Effect of plant spacing and time of planting on seed yield of kenaf, *Hibiscus cannabinus* L.
J. Amer. Soc. Agron., 1945, 37: 969-77, bibl. 6.
 The year's trials, conducted at the Cuban Experiment station, showed that highest seed yields of kenaf are obtained planting in July or August, preferably the former, and by lling in rows 20-24 in. apart with a distance of 2-3 in. tween plants in the row. Planting for fibre should be ne as early as possible in the rainy season.

6. CRANE, J. C., ACUÑA, J. B., AND ALONSO, R. E. 633.524.3
Effect of plant spacing and time of planting on fiber yield of kenaf, *Hibiscus cannabinus* L.
J. Amer. Soc. Agron., 1946, 38: 46-59, bibl. 10.
 A result of experiments carried out at the Cuban Agricultural Experiment Station during the summer of 1944, it is recommended that for maximum yield of kenaf fibre per of land "planting be done the first of May or earlier he moisture supply is adequate, in rows 8 in. apart at the of 30 to 35 lb. of seed per acre". Full data are ented.

7. PRÉVOT, A. 633.524.3
Essais de filature et de tissage de la filasse de da. (Tests of the spinning and weaving properties of kenaf (*Hibiscus cannabinus*)).
Agron. trop., 1945, 1: 57-9.
 Experiments indicate that kenaf and certain other *Hibiscus* res are likely to afford a satisfactory substitute for jute.

8. CRANE, J. C., AND ACUÑA, J. B. 633.525.1
The comparative evaluation of fourteen types of ramie under Cuban conditions.
J. Amer. Soc. Agron., 1946, 38: 152-67, bibl. 9.
 Investigations were conducted at the Cuban Agricultural Experiment Station to determine the comparative growth pone and production of fibre of *Boehmeria utilis* and *japonica* and of 12 types of *B. nivea*, collected from various ts of the world. Following the customary commercial actice, three crops were harvested during the growing son. The three highest producers of defoliated stems re types de Francia, C and A, producing respectively 411, 20,328 and 18,999 lb. per acre. By comparison with lds reported in other countries where this plant is grown mercially, the yields obtained from some of the types ed in the investigation reported here may be considered excellent. The average percentage of fibre of the green ght of defoliated stems for the 14 types was 2·2. In this pect, type D was outstanding in that it produced an avege of 2·8% fibre of the green weight of its stems. The presented suggest, as far as percentage of fibre is concerned, that harvesting should be done as soon as the

ultimate height of the crop is reached. Based on the experimental data and information obtained, types C, de Francia and D appear to be better adapted for production under Cuban conditions, at least from the standpoint of yield of fibre, than the remainder of the 14 types tested. [From authors' summary.]

849. CRANE, J. C., AND ALONSO, R. E. 633.526.42
Fiber content in relation to length and age of *Sansevieria* Thunb. Leaves.
J. Amer. Soc. Agron., 1945, 37: 653-61, bibl. 9.
 The average fibre content of leaves which had grown under practically identical environmental conditions and were approximately the same length and age was found to be 2·67, 2·16 and 1·53% for *Sansevieria guineensis*, *S. cylindrica* and *S. zeylanica*, respectively. With an increase in length of leaf of *S. guineensis*, there was a progressive increase in the percentage fibre content accompanied by a progressive decrease in the percentage of moisture. From a 7- to 8-year-old planting of *S. guineensis*, 3,210 lb. of dry, clean fibre were produced per acre but, on a commercial basis, doubt exists as to whether more than half of this amount would be produced annually at the end of the fourth or fifth year. A short discussion is presented dealing with some of the problems which need scientific investigation before the technicalities of *Sansevieria* fibre production are solved. [From authors' summary.]—Cuban Agricultural Experiment Station.

850. JOSÉ PICKEL, D. B. 633.52.43
Uma importante planta industrial: o caruru azedo. (An important industrial plant, roselle.)
Rev. Agric., São Paulo, 1945, 20: 313-9.
 Roselle, *Hibiscus sabdariffa* L., a native of tropical Africa, was introduced into Brazil in the seventeenth century. It is cultivated for its fibres but more particularly as an ornamental and food plant. Its leaves are used as a seasoning and from its fleshy calyx wine, tea, syrup and jelly are prepared. Its seeds have diuretic and tonic properties. A better variety for fibres is var. *altissima* known under two forms, one with a yellow stem, the other with a green stem but with yellow spots on the petioles. If planted during the rainy period it will reach a height of 4 m. in two months. This plant is recommended only as an intermediate between other crops, millet, sorghum, etc. The distance between the rows should be 15 to 20 cm. and the plants 12 to 22 cm. apart in the rows, giving 500-400 thousand plants per ha. Plants grown for seed should have more space, 75×40 cm. The crop needs weeding once or twice. Gathering depends on the quality of the fibres required; if fine fibres (but with a lower yield) are desired, the plants should be gathered when 3 months old. The plants are pulled up or cut level with the ground. They are immediately defoliated and decorticated. The fruit should be gathered with care, otherwise the stems get torn.

851. JOHNSON, L. P. V. 633.64: 581.11
Physiological studies on sap flow in the sugar maple, *Acer saccharum* Marsh.
Canad. J. Res., 1945, 23, Sec. F, pp. 192-7, bibl. 8.
 Sap flow from the stumps of sugar maples was over five times as great as that from the trunks of the same trees, which were detached in November, January and March. There was no consistent variation in the sugar concentration of sap samples drawn from stumps and trunks, but samples taken from points above girdles were consistently higher in sugar than those taken from below. Sap flow is attributed mainly to the activities of living cells, and it is suggested that the oxygen concentration of the sap and the release of hydrostatic pressure in tapped trees are related to cell activities. The beneficial effect of alternating cold nights and warm days on sap flow is attributed to an increase in availability of oxygen to the living cell through the agency

VEGETABLE, RUBBER AND OTHER PLANTS

of the relative solubility levels of oxygen in water at low and high temperatures. [Author's summary.]

852. GOODSPED, T. H. 633.71

Cytotaxonomy of *Nicotiana*.

Bot. Rev., 1945, 11: 533-92, bibl. 157.

The genus *Nicotiana* consists of somewhat less than 60 valid species, with a natural distribution confined to temperate South America, western North America, Australia and a few South Pacific islands. There is evidence of the presence of a series of genetic centres or groupings of species within the genus. The author concludes that the evidence of phylogenetic relationships in *Nicotiana* which is intrinsic in the morphological and distributional data appears to be sufficiently confirmed and amplified by the cytological conclusions to justify the current taxonomic arrangement of the genus.

853. PETRUŠININ, K. V. 631.811: 581.192

The influence of the ratio of mineral nutritional components on the accumulation of nicotine in makhorka. [Russian.]

Proc. Lenin Acad. agric. Sci. U.S.S.R., 1942, Nos. 9-10, pp. 15-6.

The accumulation of nicotine in makhorka is highest when, in the NPK ratio, nitrogen and potassium are in excess over phosphorus. When $1=60$ kg. of the active substance the best effect on the accumulation of nicotine is found to be when the NPK ratio = 3: 1: 2. The NPK ratio of fertilizers applied to makhorka is not at the same time the optimum for total yield and for nicotine content. However, the total yield of nicotine in kg. per hectare is highest when the percentage of nicotine in the leaves is highest.

854. SEN, B., AND CHAKRAVARTI, S. C. 633.844: 581.143.26.03

Effect of high temperature on vernalized mustard seed.

Nature, 1946, 157: 266.

No significant devernalization takes place in mustard T.27 when (a) dried vernalized unsplit seeds are stored at room temperature for over 6 years, or (b) the resoaked, stored or fresh, vernalized, unsplit seeds are subjected to $35 \pm 2^\circ$ C. for 48 hours.

855. RAKSHPAL, R. 633.844-2.753

Mustard-aphid (*Rhopalosiphum pseudobrassicae* Davis).

Curr. Sci., 1945, 14: 272-3.

This aphid is stated to be one of the most serious pests of mustard, attacking the inflorescence so that the pods dry up. It attacks other cruciferous plants also and has been recorded as a vector of a number of virus diseases. The life cycle of the aphid is outlined. Observations show that in the migrant stage it is not a pest of mustard.

856. DOMINGO, W. E., AND CROOKS, D. M. 633.853.55

Investigations with the castor bean plant: adaptation and variety tests.

J. Amer. Soc. Agron., 1945, 37: 750-62, bibl. 12.

Extensive trials with castor bean varieties, conducted in the southern half of the United States from 1941 to 1943, showed that disease, length of growing season and rainfall are the chief limiting factors. Grey mould (*Sclerotinia ricini*), the principal disease, was found to exclude a large area of the Gulf Coastal districts as a region of adaptation. With current varieties a growing season of 180 days proved to be the minimum, but the production of earlier varieties is under way. Further, a minimum rainfall of 15-20 in. during the period April-September was found to be essential to satisfactory yields. Of 44 varieties or strains under test in the beginning only three were considered in the last year: Conner, Doughty 11 and Kentucky 38. The geographical area suitable for castor bean growing is outlined and the soil characteristics required are described.

857. DOMINGO, W. E., AND CROOKS, D. M. 633.853.55

Investigations with the castor-bean plant: II. Rate-of-planting and date-of-planting tests.

J. Amer. Soc. Agron., 1945, 37: 812-20.

Tests with the castor bean plant were carried out from 1941 to 1943 in the southern half of the United States. On basis of yield and ease of hand harvest the optimum spacing was found to be 2-3 feet in 40 or 42 in. rows. The optimum planting date in most of the region of adaptation appears to be a few days ahead of maize planting time for particular area.

858. DOMINGO, W. E., AND CROOKS, D. M. 633.853.55

Investigations with the castor-bean plant: III. Fertilizers, clipping, method of planting and time of harvest.

J. Amer. Soc. Agron., 1945, 37: 910-5.

Eight fertilizer tests in Kansas, Kentucky, Mississippi, Missouri and Oklahoma failed to show any marked yield increase from nitrogen, phosphorus or potassium, either alone or in combination, on the Conner variety of castor bean. Clipping the stem from young plants above the fourth to the thirteenth nodes in two tests in 1943 increased branching as expected, but yields of treated plants were materially reduced, largely because of delayed maturity. Surface planted plots yielded somewhat more than lists in plots in two small tests in Kansas. The differences, however, were not great. Weed control was much easier in the listed plots. In general, delaying harvest of the three common varieties of castor beans until frost in three tests in 1943 resulted in significant loss of seed by shattering. [From authors' summary.]

859. BLACKMAN, G. E. 633.854.78

The cultivation and harvesting of sunflowers.*

Agriculture, 1946, 53: 27-33.

An account of the first 3 years' experiments with sunflowers appeared *ibidem*, 1944, 50: 517-21; *H.A.*, 14: 700. The results of further research carried out during the 1944 and 1945 seasons make a modification of some of the previous statements necessary. To ensure an even and close stand of plants the best rate of sowing proved to be 20 lb. of seed per acre. After sowing the seedbed should be rolled with a ring roller, though not on soils liable to caking. For grain production and ease of combine harvesting the optimum distance in the row was found to be 9 in. (not 12 in.). Small heads produced by close spacing have the advantage of drying out more readily than large ones. Second, small seeds from small heads were shown to have appreciably higher oil content. Singling, which takes little time, should be carried out when the plants are 2-3 in. high. Weed control by chemical means has proved impracticable. The most important progress recorded concerns harvesting and threshing in that combine harvesting of sunflowers in the field was after all found to be practicable. The machinery is described in detail. Sunflowers are fit to combine until the top leaves are dry and shriveled. In the south and east of England from a mid-March sowing the earliest varieties will be in full flower in July and ready for combining some 50-65 days later. The two varieties at present recommended are Pole Star, with grey-striped seed, and the new variety Jupiter, which has black seed. Pre-cleaned seed harvested under good conditions combining should have a moisture content of 18-20%, which, without difficulty, is reduced to 12-11% in a dry place in which inlet air temperature should not exceed 110-115° F. In addition to damage by birds, wireworms and *Botrytis cinerea* are mentioned as sources of losses in the seed and in the autumn respectively. Mould damage in autumn can be avoided by early sowing (March). Experiments demonstrate that the sunflower crop

* See also 1105.

particularly suited by the conditions of southern and eastern England, yields and oil content of the seed being superior to those obtained in Russia and Argentina, the two largest sunflower-producing countries.

60. DEMIDENKO, T. T. 633.854.78-2.112
Varieties of sunflower as characterized according to their drought resistance.

C.R. Acad. Sci. U.R.S.S., 1945, 47: 513-6.

As the existing sunflower varieties, grown commercially and in breeding work, have been produced under widely differing climatic conditions, a comparative study of their drought resistance was desirable. The experiment was conducted in pots containing 6 kg. of soil. The tabulated results obtained in this manner were later confirmed in field trials. It was also found that in drought-resistant sunflower varieties withering has the effect of increasing the amount of hydrophilic colloids (reversible and irreversible), while the reverse occurs in non-resistant varieties.—The Krasnodar Plant Breeding Station.

61. AVDONIN, N. 633.854.78: 631.586
Achievements of science—in the service of socialist agriculture. [Russian.]
Social. Sel'sk. Hoz. (Socialist Agriculture), 1945, No. 4-5, pp. 54-8.

A study of meteorological records from 1880 to 1944 has led to the conclusion that in the south-eastern U.S.S.R. a dry September, October and March mean a dry crop-season following; but whenever those months are wet the season following will also be wet. The proportions of spring and autumn crops can therefore be adjusted accordingly. Drought is a prevalent danger in the south-east, and various measures are recommended for diminishing its ill-effects. Among them is the cultivation of sunflowers. These involve much labour during thinning, which should be performed when one pair of leaves has been formed. Accordingly it is suggested that the seed be sown at the rate of 4 or 5 kg. per ha., or deposited in spaced groups. Much seed would thus also be saved. Three varieties of sunflowers suitable for the dry region are referred to.

62. WHITTENBERGER, R. T. 633.854.78: 581.192
Silicon absorption by rye and sunflower.

Amer. J. Bot., 1945, 32: 539-49, bibl. 48.

Silicon, supplied as soluble sodium silicate, was absorbed by both species at all seasons approximately in proportion to its concentration in the nutrient solution. At a high external concentration (450 p.p.m. of silicon) the plants accumulated silicon primarily in their roots; lower concentrations (150 p.p.m. of silicon and less) favoured accumulation in the shoots, especially in the leaves. This relationship held for plants grown both in liquid and in solid media. Soluble silicon at high concentration was not toxic to the plants. Under some cultural and climatic conditions, growth was improved by the presence of silicon. Within a pH range of 3.6 to 7.1, maximum absorption of silicon supplied in a soluble form occurred at approximate neutrality. Considerable quantities were absorbed also at a pH value as low as 3.6. With respect to growth, the effect of pH varied with the season. Data obtained from an arrangement whereby roots were separated from clay suspensions by a collodion membrane, indicated that no colloidal silicon was absorbed and that the roots secreted a silicon-dissolving substance of molecular dimensions. Evidence suggested that this root secretion was carbonic acid, which was shown to be capable of dissolving appreciable quantities of silicon from various soils containing silicates, but not from quartz sand. It was concluded that under natural conditions silicon probably is absorbed by plants, principally as temporarily-soluble silicic acid and as soluble silicates arising from the decomposition of complex silicates. The results of this study re-emphasize and broaden the rôle plants serve in the weathering of rocks and in building up

a soil. [From author's summary.]—University of Pennsylvania, Philadelphia.

863. McDERMOTT, J. J. 633.854.78-1.432: 581.11
The effect of the moisture content of the soil upon the rate of exudation [in sunflowers].

Amer. J. Bot., 1945, 32: 570-4, bibl. 6.

The rate of exudation was measured in detopped root systems of sunflower plants grown in a sandy loam soil. At a soil moisture content just above the wilting percentage the detopped roots exhibited negative exudation which turned into positive exudation as the moisture content of the soil increased. The relationship between soil moisture content and rate of exudation is mathematically expressed.—Estacion Experimental Agricole, del Ecuador.

864. ŠARAPOV, N. I. 633.879
A new kind of raw material as a source of tannin.
[Russian.]

Priroda (Nature), 1940, No. 4, p. 68.

An unpigmented tannin can be obtained from the leaves of *Cotinus coggygria* Scop. as follows: the leaves are extracted with water, and the extract hydrolysed with 1% sulphuric acid. The product is purified with carbon and extracted with acetic-ethyl ether. The free acids having been neutralized in the ether extract, the ether is distilled at reduced pressure. The resulting tannin is of high quality and can be used in pharmacy, textiles, paints and varnishes. The plant species is widespread and plentiful in the U.S.S.R., and could easily be cultivated, for it readily adapts itself to many kinds of conditions.

865. KALASNIKOV, V. P. 633.88
Chemistry and the manufacture of medicinal compounds. [Russian.]

Priroda (Nature), 1944, No. 5-6, pp. 40-7.

Whether it will be more economical and convenient to synthesize medicinal preparations or to extract them from plants depends on costs and on the chemical processes which can be employed. As regards plants, those bearing alkaloids and glucosides are specially important to medical science. A. P. Orekhov and his fellow investigators have studied 900 species belonging to the flora of the U.S.S.R.; 150 of them were for the first time found to contain alkaloids, of which 65 had never been previously described. A substitute for the glucoside, strophanthine, has been discovered in a climbing plant growing in Transcaucasia; it is another glucoside, chemically related to the first, and is called periplocine.

866. EARDLEY, C. M. 633.88
Squirtng cucumber, *Ecballium elaterium* (L.).
A. Rich.

J. Dep. Agric. S. Aust., 1943, 46: 382-4, bibl. 12.

A botanical description of this interesting medicinal plant, which has become naturalized in South Australia.

867. TROITSKI, A. A. 633.88-1.56
Chemical investigations of distillations of the poisonous buttercup. [Russian.]

Proc. Lenin Acad. agric. Sci. U.S.S.R., 1942, No. 11-12, pp. 33-6.

An article describing the chemical analysis by distillation from the poisonous (celery-leaved) buttercup, *Ranunculus sceleratus*.

868. MARION, L., AND MANSKE, R. H. F. 633.88
Identity of the hydrolytic base obtained from *Delphinium brownii* Rydb. with lycocotonine.

Canad. J. Res., 1946, 24, Sec. B, pp. 1-4, bibl. 3.

The base obtained by hydrolysis of the chief alkaloid present in *Delphinium brownii* Rydb. is shown to be identical with lycocotonine by comparison with an authentic sample of the latter. The perchlorate, picrate, and methiodide of lycocotonine from both sources have been compared and found to be identical.

VEGETABLE, RUBBER AND OTHER PLANTS

869. DU FRANE, B. 633.88
Candelilla wax.
Agric. Amer., 1945, 5: 99.
 The candelilla shrub, *Euphorbia antisiphilitica*, is native to north-eastern Mexico and grows in a desert-like area where the annual rainfall may be less than 4 in. Most of the wax, many uses of which are mentioned, is found in a thin film on the stems. In addition, wax forms in the plant's outer cells and exudes from certain pores. Harvesting and wax extraction is usually carried out in winter, when the plant's supply of wax is at its height. If fields are allowed a partial rest every 3 or 4 years, a stand will continue to produce for 12 to 16 years.

870. NAVASHIN, M. S., AND CHEREDNICHENKO, A. F. 633.913: 581.192
 A field method for estimating rubber content in live roots of rubber plants.
C.R. Acad. Sci. U.R.S.S., 1945, 48: 289-92.
 This very simple method of estimating the rubber content of roots in the field consists of mixing a drop of latex from the live root with a certain amount of water in a test tube. After stirring a printed text is held behind the test tube. If the opalescence of the latex is so great as to make reading impossible, the root is considered worth propagating. This quick method makes mass selection possible, and it is hoped that an increase in rubber content of the roots will shortly be the result.

871. WATSON, R. W., AND LEVITIN, N. 633.913
 Resin-rubber from Canadian grown plants. IV.
 Analytical study of milkweed pod gum.
Canad. J. Res., 1946, 24, Sec. F, pp. 95-105, bibl. 23.
 Recent interest in the production of milkweed floss has led to a study of possible by-products from the waste hulls. The present paper deals with the extraction of a resin-rubber gum from alkali-digested pod hulls of the common milkweed *Asclepias syriaca* L.

872. HOFFMANN, C. H. 633.913-2.7
 Insect pests of cultivated goldenrod.
J. econ. Ent., 1945, 38: 355-8.
 The insect pests recorded in 1943 in a survey of *Solidago leavenworthii*, grown experimentally for rubber in five southern states, are described in relation to the part of the plant injured.

873. HUNTER, A. S., AND KELLEY, O. J. 633.913-1.432
 The growth and rubber content of guayule as affected by variations in soil moisture stresses.
J. Amer. Soc. Agron., 1946, 38: 118-34, bibl. 9.
 While a previous paper discussed the effect of moisture stress on nursery-grown guayule with respect to transplanting (*ibidem*, 1945, 37: 194-216; *H.A.*, 15: 669), the experiments reported in the present article deal with plants in their second year in the field, grown both on a light soil and a heavy soil under a wide range of soil moisture stresses. The effect of the treatment varied according to soil, thus on sandy loam the higher levels of moisture were found to produce the highest shrub and rubber yields, whereas on silty clay loam the lowest moisture levels gave highest yields. Rubber percentage was shown to be inversely related to dry shrub weight, fertilizer applications increasing the latter but decreasing the percentage and absolute amount of rubber.

874. SEVERIN, H. H. P. 633.913-2.8
 Virus diseases of guayule.
Phytopathology, 1945, 35: 737-8.
 The reactions of guayule seedlings [*Parthenium argentatum* A. Gray] to a number of plant viruses have been tested experimentally. With the ordinary tobacco-mosaic virus seedlings were infected by mechanical inoculation and developed small necrotic areas on the inoculated leaves. When inoculated with the tobacco-ring-spot virus guayule seedlings proved to be symptomless carriers. No infection was observed from inoculations with cucumber-mosaic, celery-mosaic, beet-mosaic, sugar-beet curly-top, and California-aster-yellow-wilts viruses.

875. KUPČOV, A. I. 633.913-1.521
 Preliminary data on the breeding of tau-saghyz.
 [Russian.]
Proc. Lenin Acad. agric. Sci. U.S.S.R., 1942, No. 11-12, pp. 18-23.
 Data are tabulated to show the size of roots and yield of selected forms of tau-saghyz [*Scorzoneroides tau-saghyz*]. "Giant" forms are mentioned with root diameter 2 to 3 times that of the ordinary type. Fixing such forms by selection will be a great step forward in the cultivation of tau-saghyz for caoutchouc.

876. MINBAEV, K. M. 633.913-1.523
 New methods of breeding kok-saghyz. [Russian.]
Proc. Lenin Acad. agric. Sci. U.S.S.R., 1942, No. 1-2, pp. 24-32.
 The present methods of mass and family selection of kok-saghyz does not take into consideration the biological characters of its development. The author recommends that selection of one-year plants should be based on the time of fertilization and of the ripening of the seed, and that of two-year plants on individual vigour. Data in support of these recommendations are tabulated.

877. NAVASHIN, M. S., GERASSIMOVA, E. N., AND CHEREDNICHENKO, A. F. 633.913
 Tetraploid kok-saghyz as a variety of improved productivity.
C.R. Acad. Sci. U.R.S.S., 1945, 47: 432-5, bibl. 3.
 The descendants of the tetraploid kok-saghyz plants produced by the authors (see *ibidem*, 1941, 31: 43-6; *H.A.*, 12: 1414), have retained their distinctive characters after continued propagation. Large-scale cultivation of the new variety in Kazakhstan shows that the increase in root weight and rubber yield over the diploid type averages 60%. The tetraploid may be credited also with the following advantages: Larger seed, more robust seedlings, increase in the mass of roots which facilitates their lifting, easier late production from larger latex vessels, larger diameter of rubber filaments upon coagulation. The great variability of the new type promises further improvement by selection.

878. BRAGINA, F., AND TARASOV, T. 633.913
 Achievements of the leading rubber growers in the Vladimir Province. [Russian.]
Social. Seljsk. Hoz. (Socialist agriculture), 1945, No. 7-8, pp. 53-8.
 The average yield of kok-saghyz roots and seeds from the 2-year-old plantations in the Vladimir Province is higher than the general average for the whole of the U.S.S.R. More than 80% of collective farms growing kok-saghyz allocated 8 to 12 ha. to it. These form part of the general field rotation and are mainly sown on a bare fallow to which 15 to 20 tons of farmyard manure are applied. Ploughing is done to the depth of 20 cm. and both late autumn and spring sowing is said to have given equally good results. The important factor conditioning high yields of roots and seeds is the carrying out of all pre-harvest operations within the shortest possible time after sowing. Thus, at one of the leading collective farms on 2-year-old plantations harrowing 4 hoeings, 3 weedings and one application of mineral nutrients were carried out between 30 April and 8 June; the seeds were harvested, 18 kg. per hectare, between 20 June and 20 July, and the roots, 10 centners per hectare, from 23 July to 1 August; on all these operations 58 man-days per hectare were required. In some districts as much as 16.3 centners of roots and 41.5 kg. of seeds were obtained from each hectare. Details of manuring, application of mineral fertilizers, planting, spacing and harvesting are given in the concluding part of the paper.

879. IVANOVA, T. C. 633.913: 581.192
 Accumulation of rubber in kok-saghyz in various zones of eastern Siberia. [Russian.] *Proc. Lenin Acad. agric. Sci. U.S.S.R.*, 1943, No. 2, pp. 23-4.
 Figures are given showing the percentage of caoutchouc in the dried roots of kok-saghyz from six different botanico-geographical zones of eastern Siberia.

880. FILIPPOV, D. J. 633.913: 581.192
 Determination of the rubber content in the roots of kok-saghyz from the character of the latex film. [Russian.] *Proc. Lenin Acad. agric. Sci. U.S.S.R.*, 1943, No. 3, p. 24.
 The thickness of the latex film formed on the surface of a transverse section of the root of kok saghyz is an indication of the rubber content of the root, the thicker the film the higher the percentage of rubber. This affords a simple and exact method of estimating the rubber content of the roots.

881. KEDROV-ZIHMAN, O. K., AND KEDROVA-ZIHMAN, O. E. 633.913-1.811
 The influence of lime and trace elements on the yields of kok-saghyz and on the accumulation of rubber. [Russian.] *Proc. Lenin Acad. agric. Sci. U.S.S.R.*, 1942, No. 9-10, pp. 7-10.
 It is quite possible to cultivate kok saghyz on acid podzol soils when they are limed and receive suitable fertilizers. Under these conditions it is advisable that the fertilizers should contain trace elements, particularly boron. Liming very acid podzols has a very marked positive effect on the yield both of roots and seed, and at the same time there is no decrease in the percentage of caoutchouc. It also helps to hasten cultivation. Boron, with liming, assists in increasing yields of roots, of the above ground vegetative organs and particularly of the seeds; it also results in an increase in the accumulation of caoutchouc. The increase in the size and yield of the plants as a result of applications of boron fertilizers is accompanied by an increase of the boron-content of the plants. Uranium and manganese, with liming, have a favourable influence on the yield of roots and leaves of kok saghyz, while molybdenum increases the yield of roots.

882. ALTUHOV, M. 633.913
 Growing kok-saghyz from seedlings. [Russian.] *Social. Sel'sk. Hoz. (Socialist Agriculture)*, 1944, No. 7, pp. 58-9.
 Although the method of planting individual seedlings gave good results in the past, it has not hitherto been used to any large extent owing to the high cost of labour. From 60 to 75 man-days per ha. are required for planting out 200,000 to 225,000 plants. Experiments in 1943 on methods of planting by the Institute of Rubber Plants are discussed.

883. LYSENKO, T. D. 633.913-1.531
 Hand nest sowing of kok-saghyz. [Russian.] *Proc. Lenin Acad. agric. Sci. U.S.S.R.*, 1943, No. 2, pp. 18-20.
 Describes the method of hand-sowing seeds of kok saghyz in holes 35 cm. apart in rows 60 cm. apart; this requires 50,000 seeds per hectare. The seeds are sown with well rotted manure around them to give the seedlings a good start.

884. POLOVENKO, I. S. 633.913-1.531
 Preliminary results of nest sowing of kok-saghyz on Michnev Experimental Basis. [Russian.] *Proc. Lenin Acad. agric. Sci. U.S.S.R.*, 1943, No. 2, pp. 21-3.
 The paper gives the data of trials of "hand nest sowing" of kok saghyz as propounded by T. D. Lysenko (see previous

abstract). The results show the superiority in the number and weight of roots and the general weight of plants of the plots hand sown over those sown in the ordinary way by a drill.

885. KOLESNIK, I. D. 633.913-1.531
 Something new in the cultivation of kok-saghyz. [Russian.] *Proc. Lenin Acad. agric. Sci. U.S.S.R.*, 1943, No. 3, pp. 14-9.
 This paper deals further with the recommended method of so-called hand nest sowing (see above). The advantages of summer sowing over spring sowing in regions with sufficient moisture are mentioned; the plants grow away well, and there is little competition with weeds.

886. MOREHIN, M. G. 633.913
 Evaluation of kok-saghyz by digging out the roots. [Russian.] *Proc. Lenin Acad. agric. Sci. U.S.S.R.*, 1943, No. 3, pp. 20-3.
 By the usual method of field evaluation of kok saghyz it is impossible to determine weight and rubber content of the roots, and it can only be used for determining the purity of the strain in the plantation. The author suggests that the evaluation should be made by digging up the roots in trial areas measuring 0.06 to 0.09 m², and scattered about the plantation in number from 50 to 200 according to the size of the plantation, the roots to be weighed and the rubber content estimated.

887. VILIJAMS, V. V. (WILLIAMS), AND KNIAZIATOVA, E. I. 633.913: 581.192
 The formation of rubber in the roots of kok-saghyz. [Russian.] *Proc. sci. Conference Timirjazev Agric. Acad.*, 6-13 December, 1944, 1945, No. 2, pp. 109-13.
 The molecule of isoprene (C_6H_8) is the fundamental element of the molecular structure in such plant substances as the terpenes, rubber, guttapercha, balata, resins, carotinoids, phytosterols and fat-soluble vitamins. The author sets out to prove that the primary alcohol, phytol (also having an isoprene structure, and forming part of the chlorophyll molecule), is the source of all such substances as those named above, and that any artificial method which increases the content of chlorophyll in the plant must also increase the quantity of those substances. Accordingly, the inflorescences of one-year-old kok saghyz plants were periodically removed in order to encourage the growth of leaves and so increase the content of chlorophyll and its derivative, phytol, in the plants. From the results obtained it was concluded that chlorophyll, carotene, rubber, and resins are chemically related in a succession of changes in which the accumulation of chlorophyll and rubber are positively correlated, the first substance being converted into the second after passing through the carotinoid stage. The practical utility of removing the inflorescences as a method of increasing the rubber content of kok saghyz has yet to be demonstrated in two-year-old plants, the age at which they are ready for the factory.

888. TJKAVKIN, P. 633.913
 Harvesting 2-year-old roots of kok-saghyz after a preliminary removal of foliage. [Russian.] *Social. Sel'sk. Hoz. (Socialist Agriculture)*, 1944, No. 8-9, pp. 51-2.
 Experiments made by the Siberian Cereal Crops Research Institute in 1943 showed that a preliminary removal of the rosette prior to the digging up of roots increased in them their rubber content. The figures obtained on a two-year-old plantation were as follows. If the rosette was removed 4 hours before harvesting the roots, their rubber content rose only from 11.5 to 11.9%. When, however, the removal was made 24 and 120 hours before digging, the increase in the rubber content was from 9.2 to 11.2% and from 9.2 to 10.7% respectively. This method could be

used with success on 2-year-old plantations on compact soil, and requires 4 man-days per ha.

889. POPOV, G. I. 633.913: 581.144.2
Effect of conditions of culture on kok-saghyz root structure. [Russian.]
Proc. Lenin Acad. agric. Sci. U.S.S.R., 1942, No. 11-12, pp. 14-7.

The anatomy of the kok saghyz root is discussed with reference to the accessory vascular bundles that appear in cultivated plants, and their relation to the yield of latex. Experiments are described in which two plants, selected because of their well developed accessory bundles, were propagated vegetatively and by seeds. Some of the resulting seedlings showed marked differences in their development of the accessory bundles according to the conditions under which they were grown.

890. GUILJAROV, M. S. 633.913-2.617
The entomological value of the preceding crop for kok-saghyz plantings. [Russian.]
Proc. Lenin Acad. agric. Sci. U.S.S.R., 1943, No. 3, pp. 25-7, bibl. 9.

Kok saghyz is very sensitive to injury from soil organisms, particularly wireworm. It has been generally recommended that kok saghyz should follow clover in the crop rotation, but it has been pointed out that the clover crop increases the number of wireworms in the soil. Experiments carried out by the author showed that when clover came into the rotation the number of wireworms and the damage to kok saghyz were higher than when clover was omitted.

891. PLANT PATHOLOGIST, TASMANIA. 635.13: 632.8
Virus disease of carrots.
Tasm. J. Agric., 1945, 16: 167.

The virus disease of carrots recently discovered in Victoria (see H.A., 15: 682) is also widespread in Tasmania. Certain aspects of the disease are under investigation in Tasmania.

892. PETHERBRIDGE, F. R., WRIGHT, D. W., AND ASHBY, B. A. 635.13: 632.77
The biology and control of carrot fly.
Ann. appl. Biol., 1945, 32: 262-4.

The investigation, which was started in 1941 and is still in progress, stresses the importance of shelter afforded by vegetation for the degree of carrot fly infestation. Control measures were based on the sheltering habits of the pest. A poison-bait solution containing 0.8% sodium fluoride and 2.5% molasses was sprayed with a power sprayer on hedges, dykes and other places of shelter. At least 10 applications at 3-4 day intervals were found to be necessary for the first generation of flies and at least 6 applications for the second generation, the latter extending to a strip of carrots 4 yds. wide next the hedge or dyke. The treatment proved successful in each of the 4 years it was used. Preliminary trials with D.D.T., however, suggest that this insecticide offers great advantages over the poison-bait method, as intervals of about 2 weeks between applications appear to give sufficient protection. Moreover, D.D.T. emulsions can be applied in gardens and allotments, where the poison-bait method fails. Some cultural control measures are also discussed.—School of Agriculture, Cambridge.

893. ROEBUCK, A. 635.13: 632.77
The carrot fly in the Midlands.
Ann. appl. Biol., 1945, 32: 264-5.

A brief report on the carrot fly position in the Midlands and on attempts made during the last two decades to control the pest. Preliminary trials with pyrethrum and DDT indicate that one or two applications of these insecticides will give effective control.

894. WILSON, G. F. 635.13: 632.77
Investigations on the control of carrot fly (*Psila rosae* F.) in gardens.
Ann. appl. Biol., 1945, 32: 265-76, bibl. 5.

The investigations on small-scale control measures against

carrot fly under the conditions prevailing in gardens and allotments were carried out at Wisley from 1942 to 1944, covering the following aspects: (1) Effect of sowing date. Sowings made from the end of March to the third week in June resulted on the average in the same general intensity of attack, but progressively decreased on carrots sown from the end of June to the third week in July. Thin sowing is advisable to reduce singling, which should be done in the cotyledon- or one-rough-leaf-stage during the earlier hours of the day. Consolidate the soil after singling. (2) Effect of harvesting date: Lifting in October prior to the larval movements from root to root was found to avoid deterioration. Early clamping is recommended. (3) Effect of site: If sowing near hedges is unavoidable, a southern aspect is preferable to a northern and western aspect so that the prevailing wind will tend to drive the flies to the shelter. (4) Effect of cultivation: absence of cultural operations reduced carrot fly attack but also root quality. The trials will be repeated with the sowing rate halved. (5) Effect of poison bait: a poison bait mixture consisting of 0.8% sodium fluoride and 2.5% cane molasses in water was shown to be unsuccessful under garden and allotment conditions. (6) Varietal susceptibility to attack: The observations confirm those of other workers that there is little varietal difference in the degree of infestation. Differences, if any, may be related to density of foliage. The data are presented in the form of graphs.

895. TROFIMEC, N. K. 635.25/6: 581.162: 581.162.5
The biology of flowering and fertilization in *Allium*. [Russian.]
Vestn. Social. Rasten. (Soviet Plant Industry Record), 1940, No. 5, pp. 76-86.

The structure of the inflorescence and florets, their variations and the biology of flowering are described with reference to various species, e.g. *A. cepa*, *A. porrum* and *A. fistulosum*. Protandry prevails in *Allium* and the florets are clearly cross-pollinating even to the extent of interspecific hybridization, which is, however, relatively rare.

The amount of insect pollination was studied with regard to different species: the bee appeared to be the most important pollinator.

896. RYNASIEWICZ, J. 635.25: 631.4
Soil aggregation and onion yields.
Soil Sci., 1945, 60: 387-95, bibl. 18, being Contr. Rhode I. agric. Exp. Stat. 673.

The problem is approached from the point of view of the soil scientist. Onion yields were shown to increase directly with the quantity of water-stable soil aggregates >0.5 mm. in diameter at depths of 0-8 in. and with soil organic matter.

897. WALLACE, E. R., AND HICKMAN, C. J. 635.25
The influence of date of lifting and method of storing on loss of onion bulbs harvested in 1943.
Ann. appl. Biol., 1945, 32: 200-5, bibl. 6.

The experiments were laid down at Kirton, Lincolnshire and Perdiswell, Worcestershire, according to the same general plan, the same 4 onion varieties being used. A Kirton lifting was made on 26 July, 16 August and 6 September, liftings at Perdiswell being 10-11 days later. The crop was kept in unheated indoor, and roughly protected outdoor, stores. The trials were primarily designed to study the effect of the treatments on neck rot, caused by *Botrytis*, but rotting caused by eelworm, *Anguillulina dipsacis* and premature sprouting had also to be taken into account. Although at both centres the crop weight increased from the first to the second and third lifting, though at different rates, and in both cases the proportion of loss was increased by later lifting, the final results, i.e. the weight surviving from each of the liftings, were in striking contrast at Kirton and Perdiswell. The method of storage was found to have no effect on losses from *Botrytis*, but outdoor storage was clearly superior in controlling eelworm and sprouting losses. Data are presented in detail.

898. VAN BEEKOM, C. W. C. 635.25: 632.4
Vatbaarheidsverschillen voor koprot (*Botrytis* spp.) in het Nederlandsche uiensortiment. (The difference in susceptibility to neck rot shown by Dutch onion varieties.)
Tijdschr. Plziekt., 1940, 46: 208-11.

This article includes a table showing the percentage of neck rot, after storage, shown by 11 varieties; it varied from 0.9% for a selection of a brown type to 5.5% for a straw-yellow variety.

899. BOOR, J. R. 635.25: 632.48
Experiments on the control of white rot (*Sclerotium cepivorum* Berk.) in onions.
Ann. appl. Biol., 1945, 32: 210-3, bibl. 19.

Experiments made during 1943 and 1944 on the use of mercurous chloride (calomel) for the control of *Sclerotium cepivorum* in spring-sown onions are described. The application of 4% calomel dust to the seed drill at sowing time gave better results than seed treatment. 1 lb. of dust per 25 yds. of seed drill gave good disease control in bulb onions, and 1 lb./50 yds. may suffice for salad onions. The relation between disease control and the effective mercury content of the treated soil is discussed. [Author's summary.]—Tilgate Horticultural Station, Crawley, Sussex.

900. GOODEY, T. 635.25: 632.651.3
Bloat or eelworm disease of onions: recent investigations.
Abstract in *Ann. appl. Biol.*, 1945, 32: 261-2, bibl. 4.

A method of fumigation with methyl bromide is described by which eelworm in onion seed can be successfully destroyed. Germination is not affected.—Institute of Agricultural Parasitology, St. Albans.

901. VAN BEEKOM, C. W. C. 632.651.3: 635.25
Enkele opmerkingen naar aanleiding van een onder de uientelers gehouden enquête betreffende het optreden van kroefziekte (*Tylenchus dipsaci* Kühn.). (Some remarks concerning the inquiry of onion growers with regard to the appearance of the stem eelworm.)
Tijdschr. Plziekt., 1940, 46: 205-7.

With reference to the eelworm disease of onions in Holland notes are given on varietal selection, rotation of crops, previous crop (chicory suitable, peas unsuitable), soil conditions, and the environmental factors affecting infestation.

902. ARTSCHWAGER, E. 581.162.3: 632.951
Effect of DDT, sulphur and lethane dusts on germination of sugar-beet and onion pollen.
Science, 1945, 102: 482.

The germination rate of onion pollen was found not to be affected by dusting with DDT and lethane.

903. VAN DER HELM, G. W. 635.261: 633.77
Proefnemingen ter bestrijding van de preivlieg in 1939 en 1940. (Trials for the control of the leek fly in 1939 and 1940.)
Tijdschr. Plziekt., 1942, 48: 17-26.

Two kinds of infestation are to be observed on leeks, one underground caused by the grub of the onion or leek fly (*Chortophila antiqua*), the damage being mostly in the seedbed; the other above the ground caused by the larvae of the leek moth (*Acrolepia assectella*), or the leek mining-fly. Treating the seed with calomel reduces the chances of infestation below ground, but does not protect against infestation above ground. Watering the ground with 1 in 1,500 sublimate solution appears to have a good effect against the leek fly maggots.

904. RODDA, T. E. 635.34: 631.8
Comparison of two methods of fertilizer application to spring-planted cabbage.
N.Z. J. Agric., 1945, 71: 375-7.

Half the area laid down for the experiment on a Hamilton clay loam type of soil near Hamilton, New Zealand, received the fertilizer in one band on the surface at the rate of 5 cwt. per acre. These bands were covered with a ridging plough and the cabbage plants were set on the crest of the ridges with the manure underneath. In the other half of the area two bands of fertilizer 3 in. deep were placed 7 in. apart and the plants were set half-way in between. The operation was carried out in early spring (September). The first treatment was clearly superior, in that it yielded higher percentages both of early maturing and of first grade cabbages.

905. ZOBRIST, L. 635.34: 632.4/9
Le lutte contre les principaux parasites des choux. (Control of the chief pests and diseases of cabbage.)
Rev. hort. suisse, 1944, 17: 129-36.

This is an abridged translation of a German article issued by the chemical firm of Maag, Dielsdorf-Zürich. The pests and diseases for which chiefly chemical remedies or preventive measures are recommended are as follows: downy mildew (*Peronospora brassicae*), *Ceutorhynchus* spp., *Phyllotreta* sp., cabbage fly (*Hylemyia brassicae*), midge (*Contarinia torquens*), aphides (*Aphis brassicae*), white fly (*Aleurodes brassicae*), *Eurydema* sp., club root (*Plasmopora brassicae*), caterpillar (*Pieris* sp. and *Plutella cruciferarum*), *Alternaria* rot, *Meligethes aeneus*. Some form of DDT is strongly, but not exclusively, recommended for most of the pests—not for aphids.

906. POUND, G. S., AND WALKER, J. C. 635.34: 632.8
Effect of air temperature on the concentration of certain viruses in cabbage.
J. agric. Res., 1945, 71: 471-85, bibl. 14.

Air temperature was shown to have an influence on cabbage virus A, cabbage black ring and cabbage virus B concentration in cabbage plants. Concentration of the first two viruses was favoured by a temperature of 28° C., while 16° C. was more favourable to the latter. Hence, the concentration of virus A in field plants was found to decline as the symptoms of the disease recede with a decrease in temperature during the late summer and autumn.

907. LEBEAU, F. J. 635.34: 632.4
Systematic invasion of cabbage seedlings by the downy mildew fungus.
J. agric. Res., 1945, 71: 453-63, bibl. 11, being *Pat. Miss. agric. Exp. Stat. 81*.

Downy mildew, *Peronospora parasitica*, causes heavy losses in southern Mississippi to cabbage seedlings, sown in October and early November, when the plants are 2-3 weeks old. The investigation showed that oospores were the chief source of primary infection in the seedbeds. The development of the mycelium in the seedling has been studied.

908. RANGEL, J. F. 635.3: 632.4
Two *Alternaria* diseases of cruciferous plants.
Phytopathology, 1945, 35: 1002-7.

Alternaria brassicae causes a leaf spot, pod spot, and general browning of heads of cauliflower, broccoli and other cruciferous plants and also damping off, wire-stem, and spotting of seedlings. *A. herculea* is also a virulent parasite of cruciferous plants. The seeds may carry both pathogens as spores or as latent mycelium in the seed. Water is the main agent of dissemination. Semesan and Arasan were effective in reducing the amount of damping-off and wire-stem on seedlings originated from surface inoculated seeds.

909. DE WILDE, J. 635.34: 632.77
Opmerkingen bij het advies ter bestrijding van de koolvlieg. (Notes on the control of the cabbage fly.)
Meded. Direct. Tuinb., 1946, pp. 240-2.

For the control of the cabbage root fly [*Delia (Hylemyia) brassicae*, Bouché] the author recommends (a) sublimate

VEGETABLE, DRUG AND OTHER PLANTS

0.1%, 150 c.c. per plant, (b) Forbiat 1%, 75-100 c.c. per plant, (c) fruit-tree carbolineum 0.3%, 150 c.c. per plant, (d) cabbage collars, (e) "caulin" [? round the stem] rings (not in light sandy ground). Sublimate needs to be applied only once or twice, the other solutions three times. [See also *H.A.*, 10: 1053.]

910. BRUNN, L. K., AND ALLEN, T. C.

635.34: 632.78

Effectiveness of sabadilla in control of cabbage worms.

J. econ. Ent., 1945, 38: 392.

Both as a dust and as a spray sabadilla compared favourably with rotenone in controlling cabbage worms (*Pieris rapae*) and cabbage loopers (*Autographa brassicae*).—Wisconsin Agricultural Experiment Station.

911. APPLE, J. W. 635.34: 632.78
DDT to control cabbage caterpillar.

J. econ. Ent., 1945, 38: 410, bibl. 3.

Two formulas of a 1% DDT dust with a solvent gave promising results against *Pieris rapae*, *Autographa brassicae* and *Plutella maculipennis*.

912. ALLEGRAET, E. 635.52: 631.544
Vroege kropsla onder glas. (Early cabbage lettuce under glass.)

Cultuur Hand., 1946, 12: 1: 19-20.

The author anticipates a renewed interest in salads as oil becomes available and discusses the cultivation of the cabbage lettuce in cool frames and in warm greenhouses. Hints are given on varieties, manuring and cultivation of the soil, planting, the crop and its preparation for market.

913. HOWARD, H. W., AND MANTON, I. 635.561
Autopolyploid and allotetraploid watercress with the description of a new species.

Ann. Bot. Lond., 1946, 10: 1-13, bibl. 13.

The wild tetraploid watercress, for which the new species name *Nasturtium uniseriatum* is proposed, was shown to be an allotetraploid. The wild triploid originated from a cross between the wild diploid and the wild tetraploid. Descriptions and diagnoses of the three forms are provided. Cytological and genetical data are submitted in detail.—School of Agriculture, Cambridge and University of Manchester.

914. NYENHUIS, E. M. 635.615
Watermelons.

Fmg S. Afr., 1945, 20: 528, 532.

Cultural practices, varieties, diseases and pests.

915. VASUDEVA, R. S., AND PAVGI, M. S. 635.61: 632.8
Seed transmission of melon mosaic virus.

Curr. Sci., 1945, 14: 271-2, bibl. 5.

The authors state that the virus they worked with, which appeared on a seedling melon, is a strain of *Cucumis virus* (Doolittle) as shown by its reactions on differential hosts, and that it is seed-transmitted.

916. TATE, H. D., AND GATES, D. B. 632.951: 635.621
Toxicity of sabadilla to chinch bugs and squash bugs.

J. econ. Ent., 1945, 38: 391, being *Pap. J. Ser. Neb. agric. Exp. Stat.* 370.

Sabadilla, applied as a dust or spray, was shown in laboratory tests together with limited field tests to be a promising means of controlling squash bug, *Anasa tristis*.

917. MARLOWE, R. H. 635.61: 632.77
Effect of foods on ovarian development in the melon fly.

J. econ. Ent., 1945, 38: 339-40, bibl. 3.

That a sub-lethal dose of an insecticide may lower the production potential of certain insects was demonstrated by the addition of 120 p.p.m. tartar emetic to cucumber juice, which retarded ovarian development in the melon fly.

918. IVANOFF, S. S.

632.753: 635.62

A seedling method for testing aphid resistance and its application to breeding and inheritance studies in cucurbits and other plants.

J. Hered., 1945, 36: 357-61, bibl. 4.

The method consists of infesting the emerging first true leaf of cucurbit seedlings with aphids (*Aphis gossypii*). With susceptible plants the leaf petiole bends down in a very short time and the young leaf begins to curl, whereas resistant plants remain unaffected. This quick test proved to possess a high degree of accuracy. In certain cantaloupes where aphid resistance is genetically associated with resistance to downy mildew, caused by *Peronosplasmopora cubensis*, the method is applicable also for isolating mildew-resistant lines.—Texas Agricultural Experiment Station, Substation No. 19, Winter Haven.

919. VAN ORSCHAEGEN, A.

635.63

Grootvruchtige komkommers. (Large-fruited cucumbers.)

Cultuur Hand., 1946, 12: 3: 15-7.

Cucumbers can be grown with success in frames or greenhouses, one advantage being that they can follow a crop of tomatoes in those houses that otherwise would not be carrying a crop during the summer months May to October. The various organs of the plants are briefly described and advice is given on choice of varieties and all cultural operations.

920. VAN KOOT, Y.

635.63: 632.48

Enkele onderzoeken betreffende de Fusariumziekte bij de komkommer. (Investigations on *Fusarium* diseases of the cucumber.)

Tijdschr. PLZiekt., 1943, 49: 52-73, bibl. 23.

A wilting and foot rot of cucumbers can be caused by the following species of *Fusarium*: *F. angustum* causes severe foot and stem rot; *F. orthoceras* causes a somewhat less severe infection; *F. orthoceras* var. *longius* causes foot rot; *F. solani* var. *martii*. All these *Fusaria* can infect most of the cultivated cucumbers, melons and beans. The scarlet runner bean can be severely infested by *F. solani* var. *martii*. Infesting the soil with saprophytic or weakly pathogenic *Fusaria* can check renewed infection with pathogenic *Fusaria*. Chloropicrin is the best chemical for soil treatment; formalin is also useful. In localized foot rot infection Germisan can be put around the stems.

921. WALKER, W. F.

635.64

Tomato production trials and recommendations.

Tasm. J. Agric., 1945, 16: 138-43.

Trials carried out with 16 varieties of tomatoes are described and the chief characters of 12 varieties are given. The author states that no definite conclusions could be made from this single trial, but the following facts are evident. (1) Staking and training entails extra labour and should be looked upon as an intensive cultural method. (2) Some varieties appear more suited to one particular method of culture. (3) Earlier fruit yields are generally obtained from trained plants. (4) Fruit size is increased when the plants are trained. (5) Higher quality fruit was generally obtained from trained plants, but this quality improvement necessitated additional production costs.

922. ALPATIEV, A.

635.64: 631.521

Breeding frost-resistant tomatoes for out-door culture in Central Russia. [Russian.]

Proc. Lenin Acad. agric. Sci. U.S.S.R., 1944, No. 8-9, pp. 3-11.

Characters looked for in cold-resistant tomatoes are early ripening, smooth-skinned fruit of medium weight (not less than 60 g.), preferably 4- to 8-chambered, which implies flowers of relatively simple structure ensuring satisfactory fertilization, high yield of good-flavoured fruit, plants resistant to disease and short enough to do without staking. Hybrid plants were cultivated at low temperatures on

agricultural soil and submitted to trials. The most promising hybrids are described and their yields tabulated.

923. PORTE, W. S., AND WALKER, H. B. 635.64: 632.4: 631.523
 A cross between *Lycopersicon esculentum* and disease resistant *L. peruvianum*. *Phytopathology*, 1945, 35: 931-3.

This article describes the progeny of a *Lycopersicon esculentum* variety Prince Borghese crossed with pollen of *L. peruvianum*. The F_1 plants were vigorous and developed vines about twice the size of either parental stock. The plants flowered and produced pollen in the greenhouse but set no fruit unless a growth-regulating substance such as naphthalene acetamide or indolebutyric acid was applied to the pedicels or peduncle when the flowers were pollinated. However, all such fruits have been seedless. Plants propagated by cuttings when grown in an open field where many other tomato lines were growing, set fruit sparingly and very few fruit contained seed. F_2 plants grown from seeds from the field-grown open-pollinated F_1 plants showed marked phenotypic differences and most of them have been barren.

924. DIVISION OF PLANT INDUSTRY. 635.64: 631.531
 Production of high quality tomato seed for farm and commercial use.

Agric. Gaz. N.S.W., 1945, 56: 545-8.

Before the war Australia's tomato seed requirements were satisfied by imports from the United States, whereas now the country is successfully producing her own seed. Tomato growing for quality seed in New South Wales is discussed.

925. WENT, F. W. 635.64: 581.14
 Plant growth under controlled conditions. III. Correlation between various physiological processes and growth in the tomato plant.

Amer. J. Bot., 1944, 31: 597-618, bibl. 47.

For the first two papers, which described the physical apparatus used and the thermoperiodicity of San Jose Canner tomato plants, see *ibidem*, 1943, 30: 157-63; *H.A.*, 13: 849; and 1944, 31: 135-50; *H.A.*, 14: 1763. Again, the tomato plants were studied under specified optimal growing conditions. From the accumulated data "the following general picture of the processes limiting growth of a tomato plant emerges and the basis for its thermoperiodicity can be understood. Except just before wilting, the water supply does not limit growth. The hormones considered (auxin, thiamin, caulocaline) are present in sufficient quantities and do not control growth. The light process with an optimal temperature of 26° or higher, which controls growth during the day, probably is photosynthesis (or perhaps salt uptake). The optimal temperature of 18° during night is due to dual control: above 18° the rate of sugar translocation limits growth of stems as well as of roots and fruits. Below 18° the rate of the growth process itself becomes limiting".—California Institute of Technology, Pasadena.

926. COTRELL-DORMER, W. 635.64: 581.162.3: 631.588.1
 An electric pollinator for tomatoes.

Qd J. agric. Sci., 1945, 2: 157-69, bibl. 4.

The instrument described was designed for large-scale field pollination experiments in study of winter blossom-drop in tomatoes; it simulates the behaviour of a native bee (*Anthophora pulchra*) visiting tomato flowers. It consists of a fine wire loop which is caused to vibrate within a glass pollen-collecting chamber. By placing the staminal cone of the flower in the loop, and causing the latter to vibrate, pollen is rapidly shaken from the anthers into the chamber. Pollination is effected in the same manner; if the stigma is only partly exposed pollen will be thrown up on to it; if the flower contains loose pollen the vibration will add to the pollen in the chamber and at least ensure selfing, should the stigma be too deep within the flower to be reached by

pollen from the chamber. The instrument is especially useful in hybridization studies, since it can readily be sterilized and enables pollen to be collected from a number of varieties in different localities for use where desired. The construction of the instrument is shown by diagrams and plates, and close-up photographs illustrate the method of using it.

927. SWARBRICK, T. 635.64: 577.15.04
 "Glasshouse science and practice." *Fruitgrower*, 1945, 100: 425.

Replying to a contributor in a previous number of the journal the author gives further notes on a trial with hormone sprays carried out in a large commercial tomato house in the Evesham district in the spring of 1945. Owing to the hot dry weather in April and the shortage of skilled labour, the bottom trusses of this house failed to set. One application to the bottom trusses only of a suitable spray increased the yield by about 4 tons per acre as compared with the unsprayed part of the house. No emasculation was carried out prior to treatment. The fruit was of excellent quality. Some of the rogue plants produced upwards of 20 lb. of seedless fruit as the result of one application.

928. MCKAY, R. 635.64: 632.184
 "Flue dust" as an agent in the production of sun scald on tomato seedlings.

J. Dep. Agric. Eire, 1945, 42: 233-5, bibl. 2.

The occurrence of sun scald of tomato seedlings in a greenhouse in Eire as early as March was investigated and was shown to have been caused by mixing flue dust with the compost in which the plants were raised. The symptoms are illustrated by two photographic plates.—University College, Dublin.

929. VAN KOOT, Y., AND PATTIE, D. J. 635.64: 632.19: 631.811.6

Vergeling van tomatenplanten tengevolge van magnesiumtekort. (Yellowing of tomato plants as a result of magnesium deficiency.) [English summary 1 p.]

Tijdschr. PlZiekt., 1942, 48: 121-37, bibl. 11.

In Westland, Holland, two types of yellowing of tomato plants are of frequent occurrence: (1) Yellowing of the leaves, with the exception only of the tissue along the main veins. Investigation has shown that lack of magnesium is the cause. (2) Yellowing of the leaves so that all veins, even the finest, remain green. This is attributed to lack of manganese and to a high pH. The first type of yellowing is attended with an accumulation of starch in the leaves, whereby these are caused to swell and become brittle. Although the symptoms suggest virus infection, observations indicated that the disease had no parasitic character. Attempts to transmit the disease from diseased to healthy tomato plants, either through sap, grafting or insects (thrips, several aphides or white fly), had negative results. [From authors' summary.]

930. JUMELET, A., AND VAN KOOT, Y. 635.64: 632.19
 Factoren, die het optreden van neusrot bij tomaat bepalen. (Factors determining the incidence of blossom-end rot of tomatoes.)

Tijdschr. PlZiekt., 1945, 51: 93-115, bibl. 9.

Blossom-end rot was investigated on tomato plants in pots. The nature of the soil, degree of acidity, concentration of salts and water supply were the factors differentiated. Peat soil, sandy soil containing humus, and clay soil with little buffering capacity were compared. The pH was fixed at three different values, acid, medium acid, and alkaline; it was highest on the sandy soil and lowest on the peat. The data obtained are presented in 12 tables. Lowering the pH resulted in an increase in salt concentration. A low pH and a high salt concentration in the soil greatly increased the incidence of blossom-end rot. There was an almost direct relation between the occurrence of blossom-end

rot and pH and/or salt concentration. There exists an interaction between the degree of acidity and the salt concentration of such a kind that a low pH and a high salt concentration intensify each other's effect. This, however, does not obtain in peat soil.

931. BUGOJAVLENSKI, A. A. 635.64: 632.8
The big bud of tomatoes. [Russian.]
Proc. Lenin Acad. agric. Sci. U.S.S.R., 1942,
 Nos. 5-6, pp. 41-3.

The symptoms of big bud in tomatoes are a mosaic mottling followed by further yellowing, crumpling and narrowing of the leaf blades, irregular unfolding of the sepals, greenish petals, yellow, often ribbed and hard fruit. Various combinations of NPK did not reduce the disease, and the application of ashes intensified it. In one instance the application of gypsum to the soil resulted in less big bud. Spraying the upper surfaces of the leaves with milk of lime, to form a screen, caused a reduction of big bud by 4 to 5%.

932. SUKHOV, K. S., AND VOVK, A. M. 632.8
On the identity of yellow of kok-saghyz with yellow of aster and its possible relation to big bud in tomato.

C.R. Acad. Sci. U.R.S.S., 1945, 48: 365-8, bibl. 14.

Yellow of kok-saghyz causes serious damage in certain parts of Russia; it is transmitted by *Macrostelus quadripunctata*. The authors assume that the virus is identical with aster yellows, *Callistephus virus 1*, and possibly also with the causal agent of big bud of tomato, *Lycopersicum virus 5*.

933. COLQUHOUN, T. T., AND McCARTHY, D. F. 635.64: 632.3
The Grand Rapids disease of tomatoes.

J. Dep. Agric. S. Aust., 1943, 46: 310-3, bibl. 6.

The symptoms of Grand Rapids disease of tomatoes, caused by the bacterium *Aplanobacter michiganense*, are described and illustrated. Although the disease is regarded as serious in New South Wales, it has not made much headway in South Australia. Sanitary measures, the use of seed from disease-free plants and seed disinfection with corrosive sublimate are recommended in order to preserve relative freedom from the trouble in the State. A short rotation, excluding tomatoes for at least two years, is adequate to clear the soil of possible infestation.

934. MOORE, W. D., AND REYNARD, G. B. 635.64: 632.4
Varietal resistance of tomato seedlings to the stem-lesion phase of *Alternaria solani*.

Phytopathology, 1945, 35: 933-4, bibl. 5.

One of the most serious disease problems connected with the production of tomato seedlings in the southern states for use in the northern canning areas is stem infection by *Alternaria solani*. Tests were made by the authors and strains selected. While these strains do not possess complete resistance to stem infection and are not comparable to the average canning tomatoes in size and quality of fruit, they possess definite possibilities as stock that may be used for crossing with other varieties in a disease-resistance breeding programme.

935. BAKKER, M. 635.64: 632.48
Resistentie tegen de bladvlekkenziekte van de tomaat, in de praktijk "Meeldauw" genoemd. (Resistance to tomato leaf mould.)

Meded. Direct. Tuinb., 1946, pp. 167-9, bibl. 8.

A note on resistance and susceptibility to tomato leaf mould (*Cladosporium fulvum*) with particular reference to the resistant variety Veto-mold, to hybrids of *Lycopersicum pimpinellifolium*, and to the appearance of biologic forms of the fungus.

936. MILLER, L. W. 635.64: 632.7
The insect pests of tomatoes.

Tasm. J. Agric., 1945, 16: 144-8.

Notes on the type of injury caused, life history and habits,

and control, are given for the tomato moth (*Heliothis armigera*), cutworms, vegetable weevil (*Listroderes obliquus*), potato moth (*Gnorimoschema operculella*), aphids, white fly (*Trialeurodes vaporariorum*), tomato mite (*Phyllocoptes lycopersici*), and thrips.

937. TROUT, S. A. 635.44
The harvesting, packing and marketing of tomatoes.
Qd agric. J., 1945, 61: 176-80.

This article includes notes on picking maturity, colour grading, size grading, packing, and stencilling of the cases. Four tomato packing charts are given for fruit packed in the half-bushel dump case made on the narrow system—internal dimensions $18 \times 7\frac{1}{2} \times 8\frac{1}{2}$ inches. Plates illustrate closed pocket packing 2-1 pack, and open pocket packing 2-2 pack.

938. VOVK, A. M. 632.8: 635.65
Mosaic on Leguminosae.

C.R. Acad. Sci. U.R.S.S., 1945, 48: 213-5, bibl. 22.

Transmission of mosaic within the pea, *Phaseolus* and *Vicia* group was studied.

939. HUYSKES, J. A. 633.65: 546.27
Over de beteekenis van borium voor de boonencultuur. (The significance of boron in bean cultivation.)

Tijdschr. PlZiekt., 1940, 46: 133-9, bibl. 9.

The author concludes from observations on trial plots that an application of 20 kg. borax per ha., the quantity given to prevent heart-rot in beetroot and not enough to cause injury to potato crops, causes typical damage on French beans. It is possible that similar injury may occur on farms and in gardens in Holland. The appearance of boron deficiency symptoms on beans is, however, unlikely.

940. HUBBELING, N. 635.65: 632.3/4
De invloed van de uitwendige omstandigheden bij het optreden van boonenziekten. (The influence of environment on the incidence of bean diseases.)

Tijdschr. PlZiekt., 1942, 48: 225-34, bibl. 21, 5 plates.

Diseases due to deficiencies of inorganic substances showed distinct symptoms during June and July, but later on could scarcely be distinguished. With the dry, warm conditions during those two months great damage was caused by red spider and plant lice. The virus diseases transmitted by the aphids were widely distributed, particularly curl-mosaic (*Phaseolus virus 1*), and yellow mosaic (*Phaseolus virus 2?*). Stipple streak (*Nicotiana virus 11?*) was partly masked during the hot weather, but showed in August characteristic red-brown "ringspot" on the pods. The bacterial halo blight [*Pseudomonas phaseolicola* (Burk.) Dowson] is seed-borne and there was a heavy attack, particularly on Ceka beans. Rust and foot rot diseases were also studied in relation to weather conditions.

941. MASTENBROEK, C. 635.65: 632.3
De vatbaarheid van boonrassen voor de vetylakkenziekte. (The susceptibility of bean varieties to halo blight.)

Tijdschr. PlZiekt., 1943, 49: 135-62, bibl. 11.

The susceptibility of 64 varieties of bean (*Phaseolus vulgaris*) to halo blight [*Pseudomonas phaseolicola* (Burk.) Dowson] was tested by a new method of inoculation. Most of the varieties were also on trial in the field. For inoculation bacterial suspension was obtained from severely infected plants which were split up and placed in water. Seedlings were inoculated as soon as they appeared above ground, the bacterial suspension being injected into the stems. A scale of infection was used from 0 to 4, the 4 representing severe infection and early death of the plant. Sixteen of the varieties proved very resistant, 4 resistant, 22 moderately susceptible, 10 susceptible, and 12 very susceptible. Of th-

6 very resistant varieties only Blanca white bean originated 1 Holland; the others are American. Among the resistant varieties are Noordster and the stringless Dubbele.

42. KOOPMAN, C. 635.65: 632.3
De bestrijding der vvetlekkenziekte. (Control of halo blight.)

Tijdschr. PlZiek., 1944, 50: 62-8, bibl. 9.

he recording of halo blight (*Pseudomonas medicaginis* var. *phaseolicola*) of beans in America in 1921 and its appearance in Germany and Holland are mentioned. The control of the disease is discussed, based on work carried out in Germany, chiefly by Hähne, who obtained good results by spraying two or three times with 1% bordeaux mixture.

43. REID, W. D., AND TAYLOR, G. G. 635.65: 632.3
Control of halo-blight and anthracnose of beans.
N.Z. J. Sci. Tech., 1945, 27, Sec. A, pp. 90-3, bibl. 2.

is the result of two seasons' trials carried out in New Zealand, it was found that four applications of a 6-8-100 bordeaux mixture gave a high degree of control of halo-blight (*Pseudomonas medicaginis*) and a moderate control of anthracnose (*Colletotrichum lindemuthianum*) of beans. Yield increased in proportion to the control obtained by spraying.

44. WILTEN, W. 635.655: 632.3
De wind als belangrijke factor bij de verspreiding van de vvetlekkenziekte van de boon. (The wind as an important factor in dispersal of halo blight of beans.)

Meded. Direct. Tuimb., 1946, pp. 234-40.

ield observations show that, in Holland, halo blight of beans [*Pseudomonas phaseolicola*] spreads mostly in a north-east direction, carried by the prevailing south-west winds. Experimental randomized plots were set out to obtain more precise information on this point. The results obtained show that both wind and rain are involved in the dispersal of the halo blight organism.

45. BURKHOLDER, W. H. 635.65: 632.3
The longevity of the pathogen causing the wilt of the common bean.

Phytopathology, 1945, 35: 743-4.

Recent tests by the writer show that *Corynebacterium accuminfaciens* will live for 24 years in association with bean seed under room conditions.

46. YARWOOD, C. E. 632.4: 635.65
Copper sulphate as an eradicant spray for powdery mildews.

Phytopathology, 1945, 35: 895-909.

he experimental demonstration that the eradicant value of bordeaux mixture for bean powdery mildew decreased with increasing amounts of lime in the spray (see H.A., 14: 619) stimulated this further study of copper sulphate as an eradicant spray for powdery mildews. Injury from blue-one sprays was measured on field- or greenhouse-grown bean, cucumber, cantaloupe, beet, grape, pear, hop, mustard, potato, tomato, rose, and apple foliage. The concentration of bluestone spray to cause 50% injury varied from a minimum of 0.035% bluestone for mustard to a maximum of over 10% with beet; the injury was usually less when a spreader was added. For 95% eradication of bean powdery mildew a spray containing about 0.04% bluestone plus spreader was required, while similar control required about 4-4 as much copper in the form of bluestone without a spreader, 6-4 times as much in the form of bordeaux plus spreader, and 18 times as much in the form of bordeaux without spreader. On the basis of maximum control with minimum injury, 0.06% bluestone plus spreader was the best effective spray. Conidia of *Erysiphe polygoni* from bean and from mustard germinated well on the surface of solutions containing 10% bluestone. The spray concentration necessary for 95% eradication of bean powdery mildew

and cucumber powdery mildew decreased from a maximum of about 0.3% bluestone applied at time of inoculation to about 0.03% bluestone applied 8 days after inoculation. The green weight of foliage and the yield of fruit on bean, cucumber, and cantaloupe plants on which powdery mildew was controlled with eradicant applications of bluestone plus spreader in greenhouse and field tests was greater than on comparable unsprayed plants.

47. SNEEP, J. 634.65: 632.4
De Ascochyta-vlekkenziekte van de boon (*Phaseolus*). (The Ascochyta spot disease of beans.)

Tijdschr. PlZiek., 1945, 51: 1-16, bibl. 12.

The Ascochyta spot diseases of bean (*Phaseolus*) are caused by *Ascochyta phaseolorum* Sacc. and *A. boltshauseri* Sacc. Symptomatically the two diseases are similar and both are transmitted by the seed. In the seedling stage a brown stripe, later turning black, appears on the hypocotyl. During cool and wet weather the fungi attack nearly the whole plant. The leaf spots show concentric rings; the spots on the pods are less regular than those on the leaves. The spores are distributed chiefly by rain. Old pods are more easily infected and the seeds in them more easily attacked than the young pods. All varieties of French beans cultivated in the Netherlands are susceptible to these diseases. Only disease-free seeds should be planted, and for this purpose disease-free pods should be selected. Removal of diseased seeds by hand is not sufficient. [From author's summary.]

48. YU, T. F. 635.651: 632.482
The red-spot disease of broad beans (*Vicia faba* L.) caused by *Botrytis fabae* Sardiniæ in China.

Phytopathology, 1945, 35: 945-54, bibl. 26.

A red-spot disease of broad beans in China is identical with one found in Spain, caused by *Botrytis fabae* Sardiniæ. Under conditions favourable for the fungus affected leaves may collapse or plants may be so defoliated that pods do not form. Lesions on petioles and stems are oblong, elliptical, and deeply sunken at the centre with a deep red margin. Their size varies considerably depending on the size of the part affected. Lesions on large stems may be 1 cm. long. On pods the fungus occasionally produces very small red spots which remain throughout the season. No apparent damage from the fungus has ever been observed on the pods.

49. MORRISON, H. E., MOTE, D. C., AND RASMUSSEN, W. B. 632.951: 632.656: 635.65
DDT to control *Scutigerella immaculata*.

J. econ. Ent., 1945, 38: 419, being Tech. Pap. Ore. agric. Exp. Stat. 462.

Normal yields of beans, variety Bountiful, in soil heavily infested with the symphytid *Scutigerella immaculata* were obtained by mixing 4 oz. of DDT dust (3% Geigy) with 5 oz. of seed. Germination was approximately 2 days delayed, but no other detrimental effect of the treatment was observed.

50. BRANNON, L. W. 635.65: 632.78
Insecticidal tests for control of green clover worm and *Autographa* on snap beans.

J. econ. Ent., 1945, 38: 403-4, bibl. 3.

Cryolite dust diluted with talc was found to give superior control (reduction of 86-92% 72 hours after treatment) of *Plathypena scabra* and *Autographa* sp. on snap beans to all insecticides tested.

51. FISHER, E. H., AND ALLEN, T. C. 635.65: 632.754
Control of potato leafhoppers infesting string beans.

J. econ. Ent., 1945, 38: 392.

Empoasca fabae in string beans was effectively controlled with sabadilla dust.—Wisconsin Agricultural Experiment Station.

VEGETABLE, RUBBER AND OTHER PLANTS

952. MAAN, W. J. 635.65: 632.76
De groote dennensnuitor als aantaster van boonen. (The great fir weevil infesting beans.)
Tijdschr. PlZiekt., 1943, 49: 171.

Describes a severe infestation of stringless beans by the great fir weevil *Hylobius abietis* L. It seems probable that the weevils had come from some fir stumps that had been piled up, the previous autumn, in the vicinity of the allotments where the outbreak occurred.

953. BRANNON, L. W. 635.653: 632.78
Biology and control of the lima bean vine borer.
J. econ. Ent., 1945, 38: 407-8, bibl. 2.

Cryolite dust reduced the number of galls in lima beans, caused by *Monoptilotia pergratialis*, by 68% as compared with the controls. Particulars of the treatment are given.

954. EARLEY, E. B., AND CARTTER, J. L. 635.655: 581.036
Effect of the temperature of the root environment on growth of soybean plants.
J. Amer. Soc. Agron., 1945, 37: 727-35, bibl. 5.

Under a wide variety of aerial environmental conditions in the greenhouse a root temperature of 22°-27° C. proved the most favourable for maximum dry weight production of top and roots in soybeans. Low (12°-17° C.) and high (37° C.) root temperatures were found to prevent optimum plant development.

955. ALLINGTON, W. B. 635.655: 632.3
Wildfire disease of soybeans.
Phytopathology, 1945, 35: 857-69, bibl. 10.

Wildfire is common on soybeans in most of the commercial soybean growing areas of the United States. The damage in isolated areas is severe. This disease and wildfire of tobacco are considered to be caused by the same organism, *Pseudomonas tabaci*.

956. SHORROCK, R. W. 635.656
Dried peas.
Agriculture, 1946, 52: 530-4.

In England the area sown to peas for harvesting dry increased during the war from less than 30,000 acres to over 130,000 acres, the bulk of the crop being grown in the eastern counties and East Riding of Yorkshire. Cultivation, harvesting and marketing practices are discussed. Investigations into methods for further improvement will be fostered by the Home-Grown Threshed Peas Joint Committee, set up by the National Farmers' Union and the Pea Pickers and Packers in 1944.

957. LVOVA, P. 635.656
Intravarietal crossing of peas. [Russian.]
Proc. Lenin Acad. agric. Sci. U.S.S.R., 1943, No. 4, pp. 26-8.

Intravarietal crossing of peas results in increased yields. The varieties do not all respond to the same degree. Some give an increase of 20 to 30%, others 10 to 15% and a few give no increase whatever. The increase in yield occurs not only from the seed obtained directly from the crossing, but also from the seed of the next generation.

958. DAVIS, J. F. 635.656: 631.55
A method for harvesting experimental plots of cannery peas.
J. Amer. Soc. Agron., 1945, 37: 963-6, being
J. Art. N. York St. agric. Exp. Stat. 647.

A method of harvesting cannery peas is described that provides a rapid and accurate means for securing plot yields, permits the use of small plot areas of 1/40 acre or less and eliminates the need for a commercial viner.

959. HOLT, M. E., AND VOLK, N. J. 631.811.5: 635.656
Sodium as a plant nutrient and substitute for potassium.
J. Amer. Soc. Agron., 1945, 37: 821-7, bibl. 13.

The crops studied at the Alabama Agricultural Experiment Station included Austrian winter peas. In this case sodium applications (NaCl) to sand cultures in the absence of potash increased growth by 17.1%. The investigation was however, chiefly concerned with cotton.

960. MEIJERS, P. G. 635.656: 632.4
Opmerkingen over " erwtenvoetziekte ". (Observations on foot rot of peas.)
Tijdschr. PlZiekt., 1941, 47: 90-3.

Growing peas repeatedly on the same ground leads in a few years to foot rot, caused by the fungi *Ascochyta pinodea* and *Fusarium* spp. Farmyard manure helps to control the disease.

961. WAIN, R. L., AND WILKINSON, E. H. 635.656: 632.952
Studies upon the copper fungicides. VII. The solution of copper from dressings on the pea seed.
Ann. appl. Biol., 1945, 32: 240-3, bibl. 15.
VIII. The penetration of copper into germinating peas.
Ibidem, 1945, 32: 243-7, bibl. 4.

The first paper shows that pea seeds exude substances, particular amino and protein constituents, which are capable of dissolving copper from an insoluble dressing by complex formation. Apparently, it is on these exudates that the fungicidal and phytocidal action of insoluble copper dressings on pea seeds largely depends. In a further experiment three varieties of pea seed exhibited less damage when treated with solutions of simple cupric salts than with solutions of equivalent strength in which the copper could occur in complex form. In general, the results suggest in the authors' words, " that when copper dissolves from dressings on pea seeds much becomes fixed on the testa, providing fungicidal protection. The soluble complex forms of copper produced by pea exudate are markedly phytotoxic and injury to the embryonic radical is regarded as the main cause of damage to peas ".—Agricultural and Horticultural Research Station, Long Ashton.

962. HURT, E. F. 635.67
Maize for table and poultry feeding. A dual purpose hybrid.
J. roy. hort. Soc., 1946, 71: 138-41.

The interest in sweet corn as a table vegetable has increased in Britain in recent years, but there is still much confusion in the two main categories of maize grown for human consumption and for stock feed respectively. Harvesting of the first kind must be done cob by cob, since the whole cob does not reach the critical stage simultaneously. The cob is suitable for gathering when the grains are at their full and only in a milky stage with their outer coat still undenuded. Imported varieties have one of the two disadvantages: either they are too delicate if introduced from countries, or they ripen too late. Breeding work of the author succeeded in fixing a strain of an open-pollinated hybrid, which can be relied upon to ripen off successfully in Britain in almost any season. This strain, later called Golden Bounty, may be termed a dual purpose variety since it produces good table cobs, while the rest of the cob can be harvested in the mature stage and used for feed purposes. In 1945 the new strain was grown commercially with good results in Kent and on the Cambridge border, Bedfordshire. In the same year it outyielded the well-known varieties Golden Bantam and Canada Cross in comparative trials at the Hertfordshire Agricultural Institute, Oaklands.

963. MINISTRY OF AGRICULTURE, LONDON. 635.8
Edible and poisonous fungi (sixth edition).
Bull. Minist. Agric. Lond. 23, 1945, pp. 35, 3s. 6d.

This new edition with a largely rewritten text giving greater detail is a great improvement. A key to the genera serves as a useful introduction and is followed by sensible keys for the edible fungus hunter and a note on preparation.

table. The giant puff-ball portrayed in this edition looks edible, which is more than could be said for a previous illustration. Newcomers described and illustrated the excellent rough-stalked boletus (*Boletus scaber* and *rsipellis*). A very much better illustration is also given in the death cap (*Amanita phalloides*).

4. ATTOE, O. J. 633.71-1.8
Leaf burn of tobacco as influenced by content of potassium, nitrogen, and chlorine.
J. Amer. Soc. Agron., 1946, 38: 186-96, bibl. 13.

b DEWEZ, W. J. 632.651.3
Het optreden van het stengelaaltje (*Tylenchus dipsaci*) in Limburg. (The appearance of the stem eelworm in Limburg.)
Tijdschr. PlZiekt., 1940, 46: 194-204.

c ELLENBY, C. 632.651.3: 633.491
Control of the potato-root eelworm, *Heterodera rostochiensis* Wollenweber, by allyl isothiocyanate, the mustard oil of *Brassica nigra* L.
Ann. appl. Biol., 1945, 32: 237-9, bibl. 10.

d FLEMING, W. E. 632.76
Evaluating the effectiveness of sprays against the Japanese beetle: a laboratory method.
J. econ. Ent., 1945, 38: 308-12, bibl. 2.

e GARRISON, C. S. 635.655
Growing soybeans in New Jersey.
Circ. N. J. agric. Exp. Stat. 499, 1945, pp. 8.

f von GILLERN, C. 677.31.02: 589.77
Düngungsversuch für eine Ertragssteigerung und Qualitätsverbesserung der Weberkarde. (A manuring experiment aiming at higher yield and improved quality of fuller's teasel [*Dipsacus fullonum*.]) [English summary 1 p.]
Landw. Jb., 1943, 93: 319-30.

g HAAGEN-SMIT, A. J., AND SIU, R. 633.913: 581.192
Chemical investigations in guayule. I. Essential oil of guayule, *Parthenium argentatum* Gray.
J. Amer. chem. Soc., 1944, 66: 2068-74, bibl. 21.

h HASSID, W. Z., AND OTHERS. 633.913: 581.192
Inulin in guayule, *Parthenium argentatum* Gray.
J. Amer. chem. Soc., 1944, 66: 1970-2, bibl. 14.

i KRAMER, H. H. 633.913
The evaluation of individual plant selections from a natural population of guayule, *Parthenium argentatum* Gray.
J. Amer. Soc. Agron., 1946, 38: 22-31, bibl. 13.

FLOWERS AND ORNAMENTALS.

55. BROWN, E. 581.9
Notes on the botanical distribution of our garden trees and shrubs.
Gdnrs' Chron., 1946, 119: 66.
using his calculations on Bean's *Trees and Shrubs Hardy in the British Isles* the author finds that the orders *Ericaceae* and *Rosaceae* provide the largest number of our garden trees and shrubs with 414 and 407 species from 33 and 37 genera respectively.

66. ROUNTREE, L. 635.951
Some annuals in California.
Nat. hort. Mag., 1946, 25: 3-17.

n account of some ornamental garden annuals, with beautiful illustrations from photographs.

67. JACOBI, E. F. 631.415: 635.9
De invloed van de zuurgraad van de grond op de ontwikkeling van verschillende gewassen. (The influence of the degree of acidity of the soil on the development of various plants.)
Verslag Vereniging "De Proefuin" te Boskoop, 1943, pp. 16-20, 1944, pp. 54-64.
number of ornamental plants were set out in plots treated

j MALIK, R. P. 633.37-2.4
Collar rot of pigeon-pea caused by *Pythium aphanidermatum* (Edson) Fitz.
Ind. J. agric. Sci., 1945, 15: 92-3, bibl. 5.

k MEIER, K. 635.1/7: 631.4 + 631.8
Ueber Boden und Düngung im Gemüsebau. (Soil and manuring for vegetables.)
Reprinted from *Gärtnermeister*, 1943, No. 4/5, pp. 16, being *Flugschr. Wädenswil Versuchsanst. Obst-, Wein- u. Gartenb.* 43, 1943.

l VAN DER PLANK, J. E., AND ANDERSEN, E. E. 632.8: 633.71
Krommek disease of tobacco; a mathematical solution to a problem of disease.
Sci. Bull. Dep. Agric. S. Afr. 240, 1944, pp. 6, bibl. 9.
See also *H.A.*, 14: 1701.

m POOLE, C. F., AND GRIMBALL, P. C. 635.615
Interaction of sex, shape, and weight genes in watermelon.
J. agric. Res., 1945, 71: 533-52, bibl. 14.

n POST, A. H., AND LITZENBERGER, S. C. 633.52-1.531
Flaxseed production in Montana.
Bull. Mont. agric. Exp. Stat. 429, 1945, pp. 14.

o RANDALL, T. E., AND RICK, C. M. 635.31
A cytogenetic study of polyembryony in *Asparagus officinalis* L.
Amer. J. Bot., 1945, 32: 560-9, bibl. 11.

p RAPHAEL, T. D. 635.25
Onion varieties.
Tasm. J. Agric., 1945, 16: 166-7.

q ROLLINS, R. C. 633.913
Evidence for genetic variation among apomictically produced plants of several F₁ progenies of guayule (*Parthenium argentatum*) and mariola (*P. incanum*).
Amer. J. Bot., 1945, 32: 554-60, bibl. 19.

r SCHWEIZER, G. 633.71
Kritische zum unmittelbaren Nikotinnachweis mit Gruppenreagenzien bei der züchterischen Bearbeitung von Tabak. (Criticism of the direct nicotine test by means of group reagents in tobacco breeding.) [English summary, 1½ pp.]
Landw. Jahrb., 1943, 93: 331-49, bibl. 38.

FLOWERS AND ORNAMENTALS

969. KRUYT, W. 577.15.04: 635.9
Veredelen met behulp van groeistoffen en een wondhormoon (Traumatinezuur). (Grafting with the help of growth substances and a wound hormone, traumatinic acid.)
Verslag Vereniging "De Proeftuin" te Boskoop, 1943, pp. 35-47.
Evidence was obtained that in the dwarf spruce and in *Juniperus chinensis* L. var. *plumosa* some success was obtained in attempts to hasten the union process in grafting. In *Rhododendron* results were less promising and at present the method is not to be recommended for this genus.

970. KRUYT, W. 577.15.04
Het stekken in verschillende media. (Cuttings in various soil media.)
Verslag Vereniging "De Proeftuin" te Boskoop, 1943, pp. 87-107; 1944, pp. 109-28.
Various shrubby plants were grown in soil consisting of different proportions of peat and sand. In peat alone the pH was 3.9, in sand alone 7.2, and the various combinations of the two varied in relation to their high peat or high sand content. The results showed that the type of soil has a great influence on the rooting of the cuttings. Thus cuttings of various *Taxus* species where planted in the autumn gave best results in mixtures with a high peat content. On the other hand in a soil of sand or with high sand content, although 100% rooting may be obtained, it takes a longer time and the rooting is not so vigorous.

971. KRUYT, W. 577.15.04: 635.976
De verdere ontwikkeling van de met en zonder groeistoffen gestekte gewassen. (The further development of cuttings with and without treatment with growth substances.)
Verslag Vereniging "De Proeftuin" te Boskoop, 1943, pp. 107-12.
Nurserymen are often sceptical of obtaining good growth from cuttings of certain plants. The author presents data showing the development of a large number of ornamental shrubs at various periods after the cuttings were planted.

972. KRUYT, W. 577.15.04: 635.939.124
De invloed van groeistoffen, vitamineen traumatezuur, aethyleen-chloorhydrine en warm water op het copuleren van rhododendrons. (The influence of growth substances, vitamins, traumatinic acid, ethylene-chlorhydrine and warm water on the union of rhododendrons.)
Jaarbk Vereniging "De Proeftuin" te Boskoop, 1944, pp. 69-77.
The results of these experiments indicate that the immersion of the scions, immediately before grafting, in ethylene-chlorhydrine, in warm water, and in warm water with a growth substance, induces better callus-formation and an acceleration of bud development. Stress is laid on the warm water treatment as being a simple technique which not only encourages early union but also the development of the scion.

973. KRUYT, W. 577.15.04: 635.9
De combinatie van het beste medium en optimale groeistof-behandeling. (Combining the best medium and the optimal growth substance.)
Jaarbk Vereniging "De Proeftuin" te Boskoop, 1944, pp. 128-32.
Experiments with cuttings of the hybrid *Rhododendron praecox* Carr. and *Syringa chinensis* Willd. var. *saugeana* Rehd. are described, the trials being with various combinations of the soil medium and growth substances to ascertain the optimum conditions for inducing rooting. The conclusion is that, within certain limits, the use of growth substances allows greater latitude in the composition of the soil used for striking cuttings. This is because the influence of the growth substance on the cuttings is greater than that of the soil.

974. KRUYT, W. 577.15.04: 631.535
Het verband tussen hardheid van de stek en optimale groeistof-concentratie. (The connexion between the hardness of cuttings and the optimal concentration of growth substance.)
Jaarbk Vereniging "De Proeftuin" te Boskoop, 1944, pp. 132-7.
Experiments with *Rhododendron praecox* and *Syringa chinensis* led to the following conclusions: (1) The best time for taking cuttings is not narrowly limited with regard to their stage of development, but may extend over several weeks. (2) By using growth substances the rooting percentage and vigour of the roots are considerably improved and with *Syringa chinensis* the period during which cutting may be planted is increased. (3) The connexion between the hardness of the cuttings and the optimal concentration of growth substance for obtaining the best results lies within rather narrow limits, however, and the treatment should be carried out within a fairly definite period of development.

975. KRUYT, W. 635.9: 631.535
De invloed van een onderdompeling in warm of koud water op de beworteling van stekken. (The influence of immersion in warm or cold water on the rooting of cuttings.)
Jaarbk Vereniging "De Proeftuin" te Boskoop, 1944, pp. 137-41.
In order to obtain definite information on the use of immersion cuttings in water, experiments were carried out with *Berberis*, *Chamaecyparis*, *Juniperus*, *Rhododendron*, *Spiraea* and *Syringa*. For all tender plants (such as *Spiraea*) it is important that the cuttings when taken should immediately be placed in water and left there for a short time. The wetting can be done also with a syringe. Long immersion in water has an injurious effect because access of air is hindered, *Syringa chinensis* being particularly sensitive to long immersion. If the cuttings are allowed to take water before planting there is less chance of wilting and growth substance can be applied at the same time.

976. KRUYT, W. 635.9: 631.535
Geen stekken verzamelen van natte planten? (No cuttings to be taken from wet plants.)
Jaarbk Vereniging "De Proeftuin" te Boskoop, 1944, pp. 141-5.
Trials were made with cuttings of *Erica*, *Juniperus* and *Taxus*. The results obtained offer evidence that it is inadvisable to take cuttings from plants wet with dew or rain. The trials have been few up to the present and the results somewhat contradictory, but the author prefers to take cuttings from dry plants.

977. KRUYT, W. 635.939.124: 631.535: 577.15.04
Het stekken van rhododendron; keuze van het juiste medium en het gebruik van groeistoffen. (Rhododendron cuttings, choice of medium and use of growth substances.)
Meded. Direct. Tuinb., 1946, pp. 255-7, bibl. 21.
The factors that operate in inducing rooting in rhododendron cuttings are (1) the stage at which the cuttings are taken, (2) the method of cutting them—a "heel" sometimes being an advantage, (3) wounding—by a superficial one-sided cut, (4) composition of the soil medium, the best results being obtained in peat, (5) treatment with growth substances. The author concludes that growth substances offer important possibilities in propagating rhododendrons from cuttings. Attention, however, must also be given to the choice of the medium in which they are to be rooted and to the other factors that stimulate root production. The effects on the cuttings of the various factors are described; the results are tabulated, and illustrated photographs.

FLOWERS AND ORNAMENTALS

78. ROODENBURG, J. W. M. 635.936.69
Vaat- en voetziekten in Amerikaanse anjers.
(*Stem and foot rot of carnations.*)
Tijdschr. PlZiekt., 1945, 51: 16-24, bibl. 23.
The most important cause of wilting in carnations is stem
rot caused by *Phialophora cinerescens*. Control of the
disease can be attained by cultivating carnations in soil free
from the fungus and using disease-free cuttings.

79. VAN DER GRAAF, A. J. 635.937.17
Hortensiapotproef 1943-44. (*Trials of hydrangeas
in pots.*)
Jaarbk. Vereniging "De Proeftuin" te Boskoop,
1944, pp. 48-51.
By adding lime at the rate of 15.7 g. per pot (13 kg. per m³)
it was possible to induce the hybrid hydrangea Deutschland
bloom with bright red flowers, which would be impossible
on untreated soil. The pH of the soil was raised by the
treatment from 4.6 to 6.41. The unfavourable influence
of the lime on rooting was not so noticeable as previously.
The addition of potash made the plants more liable to root
rot and is not to be recommended. Ammonia alum
at the rate of 30 g. per pot lowered the pH from 4.62 to
4.00, and the colour of the flowers was more blue than in
the untreated plants. Uranium in the form of uranium
phosphate can apparently completely replace the aluminium
ammonium alum.

80. VAN STEEN, J. 635.937.36: 631.544
Reukerwtjes onder koud glas. (*Sweet peas in
cool greenhouses.*)
Cultuur Hand., 1946, 12: 2: 15-16.
The forcing of sweet peas under glass in winter is described.
Varieties suitable for forcing are mentioned. The earliest
can be sown in October for picking about the end of April.
The Spencer varieties can be sown in November or even in
January. The temperature should be kept low, but above
the freezing point, and the houses should be well ventilated but
not draughty. Hints are given on seed sowing, cultivation
and manuring, planting, and care during growth.

81. RUYS, J. D. 635.939.124
Rhododendron.
Meded. Direct. Tuinb., 1946, pp. 176-90, bibl. 6.
This is an account of the distribution of the rhododendron,
and of the introduction of new species into western Europe,
followed by brief descriptions of the most important species.

82. VAN DIJK, P. J. S. 635.939.124: 581.145
Onderzoek naar het tijdstip van bloemaanleg
bij Japanse azalea's. (*Experiments on the time
of differentiation of flower buds in Japanese
azaleas.*)
Verslag Vereniging "De Proeftuin" te Boskoop,
1943, pp. 28-34.
The object of the experiment was to obtain information on
the best time for applying "short day" treatment in forcing
certain varieties of Japanese azaleas, the sensitiveness of
the buds to the treatment depending on the time the flower
buds begin to be differentiated. Data are given for 19
varieties.

83. LIHNELL, D. 635.939.124: 632.4
Försök rörande vissnesjuka hos azaleor.
(*A wilting disease of azaleas.*)
Växtskyddsnotiser, 1945, No. 5, pp. 65-9.
Wilting, often resulting in the death of the plant, is a common
disease of azaleas imported into Sweden. The fungus
Lindrocarpon radicicola Wr. was regularly isolated from
the stems of affected plants and later shown, by means of
inoculation experiments, to be the causal organism. The
fact that the disease appeared in imported azaleas only may
be accounted for by increased susceptibility of the plant
under certain conditions, such as deep planting, too liberal
watering, heavy shading and drastic changes in temperature.

984. BELENGER, E. 635.939.98
Teelt van de chrysant *Blanche Poitevine*. (*Cul-
ture of the chrysanthemum Blanche Poitevine.*)
Cultuur Hand., 1946, 12: 8-11.
The chrysanthemum variety Blanche Poitevine is popular in
Belgium both with amateurs and florists. Its special
qualities are: its low growth; white blooms; comparative
resistance to rain and rotting; its handsome dark green
leaves, and the fact that it blooms round about All-Hallows
day. The culture of this variety is said to be simple, but
the author gives advice on certain lines of procedure for
success, particularly in the choice of the mother plant,
disinfection of cuttings, cultivation and manuring, and
pinching-back.

985. VAN DER GRAAF, A. J. 635.974: 632.4
Clematiszetproef 1943-44. (*Trials with young
clematis transplants.*)
Jaarbk. Vereniging "De Proeftuin" te Boskoop,
1944, pp. 46-8.
The experiments had the object of determining the cause of
failure of young clematis plants after they are put out in
frames. The disease appears to be caused by *Rhizoctonia
solanii*, but proof of this is not yet forthcoming. Under
the conditions of the trial there was no evidence that infection
came from the soil and at present soil sterilization for the
control of the disease cannot be recommended.

986. VAN DER GRAAF, A. J. 635.976: 632.8
Proevert met *Daphne Mezereum*. (*A disease of
Daphne mezereum.*)
Jaarbk. Vereniging "De Proeftuin" te Boskoop,
1944, pp. 43-5.
A disease of *Daphne mezereum* is described. The symptoms
are: In June the leaves show yellow streaks and spots which,
during the summer, increase in number and become light
yellow to light brown; the leaves become rolled upon the
main rib and soon fall. Tests in 1941 showed that the
disease cannot be attributed to fungal infection, or to a low
pH of the soil, or to sun-scorch. Experiments proved that
the disease could be transmitted by rubbing sap from a
diseased plant into the tissues of a healthy plant. It is
therefore concluded that the trouble is a virus.

987. WILCKE, J. 632.752: 635.976
Biologie en morfologie van *Psylla buxi* L.
(*Biology and morphology of the box psyllid.*)
[English summary.]
Tijdschr. PlZiekt., 1941, 47: 41-89, 35 figs., bibl. 44.
The life-cycle of *Psylla buxi* L. is described in detail. This
psyllid is a common pest of box (*Buxus sempervirens* L.) in
most European countries and in many States of the U.S.A.
It causes only slight damage and can easily be controlled.
In Holland good results are obtained by spraying in the
winter with 5.7-5.5% of soluble carbolineum emulsion (tar
washes, Carbokrimp).

988. HALLEMANS, L. A. 632.752: 635.976
De Buxusbladvloo (*Psylla buxi* Linn.). (*The
box leaf psyllid.*)
Cultuur Hand., 1946, 12: 3: 30.
The box palms carried through the Belgian villages on Palm
Sunday are said to be often infested by the box leaf psyllid.
The affected leaves are rolled inwards. The life history of
the insect is outlined. Control measures are 6.7% carbolineum
in March and a nicotine spray in summer.

989. LYGA, A. L. 635.977
The production of seed by *Ginkgo biloba* under the
climatic conditions of the Ukraine. [Russian.]
Priroda (Nature), 1945, No. 1, pp. 66-7.
In early times, before it became confined to certain parts of
China and Japan, the Ginkgo occupied extensive areas of
the world. Its cultivation is now proving it to be well
adapted to a variety of climatic conditions, where it can

develop seed, and it survived the exceptionally hard winter of 1939-40 in all parts of the Ukraine. The author accordingly suggests that the circumstances which once reduced the area of the species to China and Japan must have been of a geological rather than climatic nature.

990. SWANBORN, P. L. 635.944: 631.83
Een kalk uitspoelingsproef op bloembollengrond.
(An experiment on potash leaching from soil
planted with bulbs.)

Meded. Direct. Tuinb., 1946, pp. 152-64.

An experiment on potash leaching was carried out with light dune-sand soil with 4 different amounts of potash applied at 3 periods of the year. Analyses of soil and of plants were made during the season. The composition of the plants (tulips var. E.V.T. Spring Glory) was hardly influenced at all by the amounts of potash applied or the time of application, though a slight increase in potash content was found with high and with late applications. On the basis of data obtained growth curves were obtained showing that at first, as a result of the dissimilation of food reserves the dry matter of the bulbs decreased, but that it increased again as the assimilating organs developed. About the same time foodstuffs were absorbed from the soil in increasing amounts. The need for nitrogen and potassium is great, but for phosphorus is small. Soil analyses showed how the potash-content decreased during the growth period. It seems that the loss by leaching in the sand-dune soil is not to be underrated and that the higher the potash-content the greater the leaching.

991. ŠMUK, A. A. 635.944: 577.16
The gladiolus as raw material for the production
of vitamin C preparations. [Russian.]
Proc. Lenin Acad. agric. Sci. U.S.S.R., 1942,
No. 11-12, pp. 10-2.

The gladiolus is described as a valuable source of vitamin C. The method of extraction and estimation is described. The various organs of the plant were analysed and the highest vitamin content was found in the leaves. The work confirmed not only the high vitamin C content of gladiolus leaves but also the exceptional value of this plant as a source of raw material for the preparation of the vitamin.

992. MCCLELLAN, W. D. 635.944: 632.48
Pathogenicity of the vascular *Fusarium* of gladiolus
to some additional Iridaceous plants.
Phytopathology, 1945, 35: 921-30, bibl. 10.

The vascular *Fusarium* of *Gladiolus* described by McCulloch (see *H.A.*, 14: 1812) proved to be pathogenic to plants of *Babiana*, *Crocus*, *Freesia*, *Iris* (bulbous), *Ixia*, *Sparraxis*, *Streptanthus*, *Tritonia*, and *Watsonia*. A *Fusarium* isolated from bulbous *Iris* was non-pathogenic to the Picardy and Dr. F. E. Bennett varieties of *Gladiolus*.

993. STOFMEEL, W. S. 635.944: 632.4
De *Botrytis*—aantasting van gladiolus-knollen-en
haar bestrijding. (Botrytis infection of gladiolus
corms and its control.)
Tijdschr. PlZiekt., 1941, 47: 154-63.

A disease of gladiolus corms attributed to *Botrytis gladioli* is described and illustrated by 10 figures.

994. STOFMEEL, W. J. 635.944
Behandeling van gladiolenkralen met ontsmettings-
middelen. (Disinfecting gladiolus corms.)
Tijdschr. PlZiekt., 1943, 49: 109-10.

Good results were obtained with two proprietary preparations (Aretan and Abavit), the corms being immersed in 1% solution for 24 hours.

995. BRIEJER, C. J. 635.944: 632.77
Bestrijding van de Narcisvlieg (*Merodon equestris*
F.) door middel van methylchloride (M-gas).
(Control of the narcissus fly by methylchloride.)
Tijdschr. PlZiekt., 1941, 47: 145-8.

The disadvantages of the warm water treatment against the

narcissus fly are set out. Results of fumigation with M-gas are tabulated, and the conclusion is that this method is effective and easy to apply.

996. VAN MARLE, G. S. 635.938.46: 632.651.3
Aantasting van begonia's door mijten, behoorende
tot het geslacht *Tarsonemus* Can. et Fanz.
(Infestation of begonia by tarsonemid mites.)
Tijdschr. PlZiekt., 1944, 50: 25-44, bibl. 75.

The symptoms of mite infestation of begonia leaves is brown discoloration of the undersides of the leaves. In slight attacks there are brown spots, or brown streaks forming a fine network on the green background. More mites are to be found on the backs of young, not quite expanded leaves. The synonymy of *Tarsonemus* Banks, is discussed; its life-cycle is described and illustrated by four plates of drawings. The mite also infests *Gloxinia* and *Gerbera*, and it became established on *Crossandra undulata* with mites transferred from begonia. The distribution of the mite is given. For control, dusting with sulphur is recommended.

997. ROODENBURG, J. W. M., AND DE BOER, S. 635.939.183: 632.4
Zijn Cylindrocarnpoorten parasitair voor
Cyclamen persicum? (Are *Cylindrocarpus* spp.
parasitic on cyclamen?)
Tijdschr. PlZiekt., 1945, 51: 26-7.

From the negative results of inoculation experiments with a number of *Cylindrocarpus* isolates the author concludes that the isolates tested were not parasitic on cyclamen.

998. ALBERTI, M. M. 585.944
El arte dificil de cultivar orquideas. (The difficult
art of raising orchids.)
Rev. Agric., Puerto Rico, 1944, 35: 174-7.

The author points out the difficulties attending attempts to raise seedling orchid plants by ordinary means, and describes the method of sowing the seed on sterilized agar, containing suitable mineral salts, in culture tubes. In the second year the seedlings are transferred to wide mouthed flasks and later they are planted out in pots and kept in a greenhouse at a temperature of 22°-25° C. The plants are transplanted from time to time to larger pots and they begin to flower when eight or ten years old.

999. (WATKINS, J. V.) 585.94
Orchids and tomato juice.
Gdnrs' Chron., 1945, 118: 155.

A discussion of a paper in *The Florists' Exchange*, 8 September 1945, by Professor J. V. Watkins of the University of Florida, who describes a simple method of raising orchids on tomato juice. The medium consists of 250 c.c.m. tomato juice, an equal amount of distilled water and 7.5 g. agar. The juice must be prepared from ripe fruits, which are mashed, the pulp being filtered through cheese cloth or filter paper. The sterilization and sowing of the seeds follows the usual practice. No adjustment is required.

1000. HAMNER, C. L., CARLSON, R. F., AND TUKEY,
H. B. 635.966
Improvement in keeping quality of succulent plants
and cut flowers by treatment under water in
partial vacuum.
Science, 1945, 102: 322-3, being *J. Art. N. York
St. agric. Exp. Stat.* 641.

A method is described that will lengthen from 4 to 36 hours the period during which succulent plants and cut flowers may be kept in a fresh condition. The plants are placed in water in a desiccator and kept submerged. By means of a water pump the air in the desiccator is evacuated to a pressure of about 30 lb. per square inch. When the vigorous escape of air from the plants ceases (after about 20 minutes) the pressure is gradually (10 minutes) brought back

mospheric pressure. In this way the air in the plants is placed by water. The consequent increase in weight is cored for 10 flower species. The effect of the treatment is tested in a chamber, where the plants were exposed to the air at a temperature of 95° F. and at 20% relative humidity together with controls. The most striking results were obtained with lilac, but the treatment was also very

successful with narcissus and trillium flowers, whereas roses gave contradictory results.

1001. MILLER, H. A., AND WETMORE, R. H. 635.939.43
a Studies in the developmental anatomy of *Phlox drummondii* Hook. I. The embryo.
Amer. J. Bot., 1945, 32: 588-99, bibl. 56.

CITRUS AND SUB-TROPICALS.

02. DINSA, S. H. S. 634.3

Nomenclature of citrus fruits.

Punjab Fruit J., 1945, 9: 130-1.

After a short discussion on the English and Punjab names of certain citrus fruits, a table is given showing the English and scientific names of 12 species of citrus with their Punjabi and other Indian names.

03. CADILLA DE MARTÍNEZ, M. 634.3(729.5)

El cultivo histórico de las citrosas en Puerto Rico. (The history of citrus cultivation in Porto Rico.)

Rev. Agric. Puerto Rico, 1944, 35: 157-65.

A general account of the citrus plant is followed by a description of the species and varieties most commonly grown. The rest of the article deals with the early history of citrus, of its introduction into Puerto Rico, and a review of the yields and exportation of citrus from the island since the beginning of the nineteenth century.

04. DALLAS, W. K. 634.334

Lemon culture in New Zealand.

N.Z. J. Agric., 1944, 68: 269-74, 341-6, 421-4 and 1944, 69: 49-53.

In New Zealand, lemon growing on an economic scale is confined mainly to restricted areas at Keri Keri, Auckland, Gisborne and Hastings. There were about 10,000 trees in registered orchards throughout the Dominion in October 1943. The main varieties used for commercial purposes are the Lisbon and the Eureka. They are generally grown on rough lemon or sweet orange rootstocks. A description is given of the raising of rootstocks and trees, of suitable sites, of land preparation, drainage, the provision of shelter and of planting. The different phases of pruning in the nursery, at time of planting, of non-bearing and of bearing trees, are dealt with in some detail. As regards cultivation, ploughing to a depth of 6-8 inches in the autumn and cross ploughing in the spring is recommended. During the summer a fine tilth should be maintained. The soil under the trees should be dug at least three times a year. Horse beans, lupins, vetches and field peas, planted by themselves or in combination with cereals, are named as desirable cover crops, while in some districts weed growth may be sufficient to maintain an adequate humus content. Intercropping with vegetables during the first 4-5 years is beneficial, if they are properly manured. The following annual fertilizer dressings are recommended for bearing trees from 4 to 12 years from planting:—Sulphate of ammonia: 2-5 lb. per tree; lime (carbonate): 1½ lb. to each tree, of sulphate of ammonia; superphosphate: 3 lb.; potash (sulphate): 1½ lb. The above amounts should be applied in spring under the spread of the tree. In addition, 2 cwt. of lime and 3 cwt. of superphosphate per acre should be given in late summer. Instructions on renovating and pruning trees are followed by a detailed discussion of budding and after-treatments, including the necessary equipment. Although none of the treatments applied against green and blue mould has proved very satisfactory, dipping the fruit in borax solution (8 lb. to 10 gallons) has given the most promise. Kerosene stove fumes are used as well as ethylene for artificial colouring. The construction of a well ventilated curing house is described and illustrated, suitable for the maintenance of a relative humidity of about 85% and an even temperature between 40° and 65° F. The

curing process may be hastened by a rise of temperature, not exceeding 75%. Grading and packing are also discussed.

1005. BENTON, R. J. 634.323
Quality of Marsh grapefruit.

Citrus News, 1944, 20: 169.

In comparing the quality of the Marsh grapefruit grown in various regions in Queensland, New South Wales, and the United States, with reference to the climates of those areas, it would appear that regions with fairly high temperatures during most of the year and with mild winters should be selected for the production of good to best quality Marsh grapefruit.

1006. REBOUR, H. 634.322: 581.162.3
A la recherche des causes d'infertilité du Clementinier. (Reasons for infertility in the Clementine orange.)

Fruits Primeurs, 1945, 15: 32-4.

The problem of infertility in the Clementine still remains to be solved. Here the author notes the incidence of faulty flowers in which style or pistil are abnormal. Whether this feature is inherited or due to outside influence is unknown, but in the author's opinion it is well worth studying.

1007. PRIEST, R. L. 634.3-1.541.11
Propagation of citrus trees.

Qd agric. J., 1946, 62: 7-9.

Seeds of the seedling bush lemon or, as it is sometimes called, the common rough lemon, are most commonly used for rootstocks in Queensland; next in order of preference is seed of the seedling sweet orange. The seedling lemon stock is easier to bud than the orange and the resultant tree also grows faster, but it is usually not so long-lived as the orange and the fruit tends to be of a somewhat coarser texture. Seed extraction, washing, and drying are briefly described. The seeds should be sown ½ to 1 in. apart in rows about 3 in. apart to a depth of ½-1 in., and, if available, clean river bed sand should be used for covering the seeds in the rows. When the young seedlings are about 6 to 8 in. high and the growth on the tops has hardened up, they are planted out at 9 to 12 inches apart, with the rows 4 feet apart. When transplanting, the seed beds should be well watered the evening before. After lifting from the seed bed, the roots should be trimmed and the tap root cut back to 3 or 4 inches. The trees should then be set out in drills in the nursery rows, care being taken to spread out the lateral roots. When the stocks have a diameter of about ½ in. at the base, they are ready for budding. In Queensland this is usually done during the spring or autumn months, and the T method of budding is usual. When budding is done in autumn the trees may be left as they are until spring, but if it is done in spring the buds may be made to start into growth at once by removing a portion of the top of the stock, or the stock may be cut half-way through, a few inches above the bud but on the reverse side, and it may be split up the middle and the top bent over on to the ground so that it is above the bud.

1008. SINCLAIR, W. B., AND BARTHOLOMEW, E. T. 631.541.11: 634.31+634.323

Effects of rootstock and environment on the composition of oranges and grapefruit.

Hilgardia, 1944, 16: 125-76, bibl. 42.

The present data, covering seven years' work of the California

CITRUS AND SUB-TROPICALS

Experiment Station, concern fruit composition of Valencia and Washington Navel orange and Marsh grapefruit as affected by stock and environment. For each variety and location fruit samples came from the same rootstock plots throughout the period. The season of maturity varied considerably with location. With all scions the highest amount of chemical substances in peel, pulp and juice was found, usually, in samples from Morton-and Savage-citrane and Trifoliolate rootstocks; the lowest, with isolated exceptions reported for Palestine sweet lime, were in samples from rough lemon stock. Results on fruits from other stocks were intermediate. Total sugars and acids, as percentages of the total soluble solids in the juice of fruit samples from the different stocks bore no relation to the mineral constituents. The fraction of total soluble solids existing as total sugars was not influenced by rootstock. Dry matter in Valencia fruits as a percentage of fresh weight varied with locality. The total ash on a dry weight basis, in peel, pulp and juice was, however, about the same. In grapefruit the mean dry matter and total ash were significantly higher in peel and pulp of fruits from one locality than in fruits from another locality. The total ash in the juice also varied according to locality. With all stocks the inorganic constituents comprised different proportions of the total ash of the peel, of the pulp and of the juice of fruits. Thus the highest percentages of calcium occurred in the ash of the peel of all scions on all stocks. Magnesium on an ash weight basis was slightly higher in the peel than in either the pulp or the juice of Valencias and Navel, whereas in grapefruit the percentage of magnesium was slightly higher in the juice. In all scions on all stocks potassium composed 15% to 20% of the total ash of the peel, approx. 30% of the total ash of the pulp and more than 40% of that of the juice. Sodium under all circumstances formed less than 3% of the total ash and less than 0.1% of dry weight. Phosphates in all cases were higher in the pulp and juice than in the peel.

1009. PROVAN, J. L., AND COLE, C. E. 634.31-1.541.11 Rootstock trials. Progress report on Irymple experiment.

Citrus News, 1944, 20: 172-3.

In these rootstock trials the best stock for both Washington Navel and Valencia Late oranges on typical Murray sand soil has been sweet orange. It produced large, shapely, uniform trees, carrying a good crop of fruit, while sour orange and citronelle stocks varied with the soil conditions and produced smaller crops. Trees on sweet orange stock produced fruit of good quality, marketable very little later than fruit from trees on citronelle stock, certainly of better flavour and carrying well into the late season. This good performance of sweet orange as a stock is noticeable throughout the Mildura district.

1010. KEBBY, R. G. 634.31-1.541.11 Trifoliata rootstock.

Citrus News, 1945, 21: 84.

If land has previously been used for citrus and is being replanted to citrus, one stock only is permissible—*Poncirus trifoliata*, as it is immune to infection by *Phytophthora citrophthora*, but in that case only Valencia or grapefruit scions can be planted, as trifoliata stock at present cannot be reliably recommended for navels or lemons.

1011. HAAS, A. R. C. 634.3-1.541.11 Peel of Valencia orange and Marsh grapefruit as affected by the rootstock variety.

Calif. Citrogr., 1945, 30: 341, 368, bibl. 2.

Data are presented on the effect of rootstock variety on the percentage of peel in fruits of Valencia orange and Marsh grapefruit trees grown at Riverside. The percentage of peel in the fresh weight of Valencia oranges was highest on lemon shaddock (33.28) and rough lemon (32.60) rootstocks and lowest on trifoliolate orange (24.92) and Savage citrange

(24.55), the average percentage in fruits from trees on 25 rootstocks being 28.78. In Marsh grapefruit all rough lemon had an unfavourable effect on the peel: fresh weight ratio in the fruit (nearly 1:1), while fruits with the lowest percentage of peel (34.58) were produced on trifoliolate orange. The dry matter content in Valencia orange and Marsh grapefruit peel from fruits of trees on different rootstocks is also recorded.

1012. CAMERON, A. E.

Battle of the rootstocks.

Citrus News, 1946, 22: 5, 15.

The merits of various citrus rootstocks are discussed. It has not yet been determined beyond doubt whether there is any superiority in any one of those commonly used, except for a limited period. Trifoliata and citrange are receiving some attention. The value of the former is that it is resistant to root-rot, but a disadvantage is that it has a stunting effect on some scions, particularly navels. Experiments suggest the possibility of a particular strain of sweet orange eventually proving to be the most satisfactory of the three for Mildura area conditions.

1013. CAMP, A. F.

Summary of the sour orange stock situation in South America.

Calif. Citrogr., 1946, 31: 77.

This summary was prepared by the author after a recent tour to several South American countries. The trouble is called "podredumbre de las racaillas" in Spanish-speaking countries, and "tristeza" in Brazil. The cause is unknown. Affected trees decline without any specific symptoms and closely resemble trees declining from waterlogging of the soil. Trees turn yellow and lose part of their leaves. Growth is very scant and the trees die back from the periphery with symptoms of zinc deficiency and general starvation. Feeder roots die and are not replaced; later large roots die. Trees go out of production or die in periods varying from a few weeks to from 2 to 3 years after symptoms appear. Orange, grapefruit and mandarin on sour orange stock are all definitely affected, but mandarins and grapefruit usually outlive sweet oranges. Lemons on sour orange stock appear to be immune, and sweet oranges, grapefruit and mandarin on sour orange but topworked to lemons will produce sound lemon tops. Sour orange seedlings are immune. Sweet orange stock apparently is entirely immune; other stocks such as rough lemon, Rangpur lime, sweet lime, grapefruit and *Poncirus trifoliata* are believed to be occasionally affected, but this is not confirmed. It occurs on a wide variety of soils. No control is known and in all areas affected it has been necessary to replant with other stock. The method of transmission is unknown. In no case has transmission by any method been proved experimental. The areas affected are South Africa, Java and South America (Argentina, Brazil, Paraguay and Uruguay).

1014. (CAMP, A. F.)

Citrus nutrition in Florida.

Calif. Citrogr., 1945, 30: 360-2.

A condensation of a paper* by the Vice-Director in charge of the Citrus Experiment Station at Lake Alfred, Florida, surveying the development of citrus nutrition research in Florida. The finding that the correction of any deficiency, including potassium deficiency, will increase frost resistance in citrus trees and fruits is described as the most important result obtained.

1015. FINCH, A. H., AND MCGEORE, W. T.

634.323-1.8

Fruiting and physiological responses of Marsh grapefruit trees to fertilization.

Tech. Bull. Ariz. agric. Exp. Stat. 105, 1945, pp. 427-54, bibl. 34.

The results of seven years of differential fertilization

* Published in *Commercial Fertilizer*, January 1945.

arsh grapefruit trees are reported. Nitrogen was the only element to exert an influence upon yields. Under the conditions of this experiment the addition of mineral nitrogen regularly increased yields in comparison to plots not fertilized. It is cautioned that this cannot always be expected to follow, but an important influence of nitrogen yield is shown. The quality of the fruit was not influenced by any of the fertilizer treatments. This is believed to be due to the fact that during much of the period of fruit growth and development there was little difference in the nitrogen content of the tree. Nitrogen applications tended to increase slightly the nitrogen in the peel but decreased the phosphorus of peel and edible portion; otherwise there was no effect of fertilizer treatment on fruit composition. Nitrogen was freely absorbed as measured by the nitrogen content of the leaves. Under the conditions of the study none of the fertilizing elements suppressed nitrogen uptake. The absorption of nitrogen suppressed phosphorus uptake. Nitrogen absorption increased calcium uptake, which in turn suppressed potassium. Nitrogen thus exerted a regulating effect upon the absorption of phosphorus, calcium and potassium. The application of phosphorus, potassium either alone or in combination with each other with nitrogen had no effect on the fruiting behavior of the tree or upon the amount of either element in the leaves or fruit. Similarly, calcium applied as calcium nitrate had no effect. [Authors' summary.]

16. JONES, W. W., VAN HORN, C. W., AND FINCH, A. H. 634.323-1.84

The influence of nitrogen nutrition of the tree upon the ascorbic acid content and other chemical and physical characteristics of grapefruit.

Tech. Bull. Ariz. agric. Exp. Stat. 106, 1945, pp. 455-84, bibl. 38.

Teen-year-old Marsh grapefruit trees on the Yuma Mesa experimental Farm, Arizona, were used in this investigation of the effects of various planes of nitrogen nutrition on important fruit characteristics. By contrasting the effects of continuing high nitrogen with those of declining nitrogen the authors show that all advantages lie with fruits produced under a declining nitrogen nutrition, viz. relatively higher Brix: acid ratio, higher ascorbic acid content, earlier maturation and no greening of fruit, relatively high weight: volume ratio and relatively thin, fine-textured peel. It is pointed out that fruit quality, especially skin thickness, is influenced by other factors, in particular moisture stress, as well as by nitrogen nutrition. However, the results show that the coarsening effect of inevitable moisture stresses in the desert may be minimized if the fruit matures under a nitrogen plane. As it would be difficult to reconcile recommendations of inducing a declining nitrogen level through the period of fruit development with standard pruning and cultivation practices, it is suggested that fruit quality will be improved by simply avoiding any treatment which tends to raise the nitrogen level of the tree during summer.

17. PENNEFATHER, R. R. 634.3-1.67

Irrigation control.

Citrus News, 1945, 21: 149.

is a note on the precautions to be taken in irrigating citrus-growing areas in Victoria, Aust. It is sometimes difficult to avoid over-watering on fast-soaking soil on flat land; in such cases some control can be obtained by lifting the area in each bay watered during an irrigation. Some soils liberal waterings have no detrimental effect on others such waterings would salt the land and kill plantings. Where waterlogging has occurred under spray irrigation it has usually been due to lack of attention to rotation and frequency of watering, and could have been prevented by using a soil auger to ascertain the water-

1018. PENNEFATHER, R. R.

Seeing underground.

Citrus News, 1945, 21: 119, 127.

634.3-1.432

The writer urges the use of the soil auger and test wells to check the height of the water-table in the irrigated citrus-growing areas in Victoria, Aust. The chief value of the test wells is to warn of approaching danger, not to diagnose trouble after it has occurred. It is a good standard practice to use a 2½ in. auger to bore the well, and 2 in. down-piping, perforated at about 3 in. intervals, can then be slid easily into the holes. It is convenient to bore the wells to 11 ft.—a depth which gives ample warning of a rising water-table—and to line them with a 12 ft. length of down-piping, leaving 1 ft. projecting above the normal ground surface.

1019. MALLABY, H.

The soil auger.

Citrus News, 1945, 21: 183.

631.4: 634.3

Stresses the importance of the soil auger in irrigated citrus orchards and describes how a farmer can make his own. It is pointed out that the most important point in irrigation, particularly on the salt-labile soils, is to know how much water is being applied or how deep the water penetrates the soil after irrigation, and this can be ascertained by using the auger.

1020. HARPER, R. S.

Irrigation principles.

Citrus News, 1946, 22: 25, 29.

634.3-1.67

An essential part of the irrigator's equipment should be a soil auger or a soil sampling tube to indicate how far water is going under the ground. At the Tatura Research Station (S. Aust.) the trees' requirements have been gauged in an experimental way by measuring fruit and shoot growth on peaches and pears; the knowledge thus acquired in conjunction with determinations of soil moisture has helped to indicate the best time to irrigate. If fruit circumference measurements are taken from time to time and the fruit actually shrinks it is time to irrigate. The aim of irrigation should be to wet the root zone only—no further.

1021. CONCEIÇÃO, A.

634.3-1.542

La copa de los citricos aportación de una teoría kipomorfométrica. (Shaping citrus on the "kipomorphometrical" theory.)

Publ. Univ. nac. Tucuman 243, 1939, 29 pp.

This paper explains the author's "kipomorphometrical" theory by which he reasons that pruning should be carried out in such a way that the head of the tree retains as far as possible the habit natural to the species or variety, with particular reference to citrus. He illustrates five types of tree-head, viz. spheroid, spherical, ellipsoid, oval, and a long oval. He advocates the "open centre" method as being of great value physiologically and hygienically.

1022. FOREMAN, F. G.

634.3-1.542

Pruning citrus trees.

Fruit World, Aust., 1945, 46: 9: 7-8.

The chief points are that correct pruning ensures renewal of fruit-bearing wood in mature trees, and young trees should be trained but not pruned severely. The treatment for frost-damaged trees is dealt with at some length. Pruning should be deferred until it is clear just how far back the wood has been killed. In reheading young trees the points emphasized are: (1) If there remains enough live wood above the union to grow a strong shoot, such a shoot may be allowed to grow and become the trunk of the new tree, all other shoots being suppressed; (2) instead of cutting back all injured shoots in proportion to the injury, it is much better, especially with lemons, to take out most of the strong upright canes entirely. In reheading mature trees the advice is, (1) where lemon trees have been killed back to any great extent it is best to withhold or decrease fertilizers during the succeeding year in order that a more moderate growth may take place, and (2) whenever large limbs are

taken out, it is well to apply dressings of paint or sump oil to the surfaces in order to prevent decay and undue drying of the wood.

1023. CAHILL, V. 634.3-1.542
 Citrus tree pruning.
J. agric. W. Aust., 1945, 22: 210-21.

This is a general account of pruning citrus and its effect on the vigour of the trees, with special reference to rejuvenating trees by cutting out all unwanted arms and cross limbs, leaving only a bare framework. The sound arms and branches should be cut right back to healthy wood. The article is illustrated by 14 figures from photographs.

1024. WEST, E. S. 634.3-2.111
 Pruning frosted citrus trees.
Citrus News, 1944, 20: 135.

It is advisable to delay pruning old trees damaged by frost until the extent of the damage is quite evident and definite. Young trees should be gone over immediately and examined periodically, because during the earlier inspections some of the frost damage is not evident. The sooner the pruning is carried out on young trees the better.

1025. SINGH, K. K. 634.31-1.556.1
 Picking oranges.

Punjab Fruit J., 1945, 9: 163-5.

Discusses the season of picking, the best time of the day at which to pick and the manner of picking. Instructions are given for avoiding injury to the fruit during picking. It is stressed that the wastage in storage depends mainly on the manner of picking and subsequent handling.

1026. DIAS MARTINS, J. E. 634.31-2.19

Causas determinantes do reverdecimento de laranjas maduras em colheita pendente, e do secamento das macro-células da polpa dos frutos, na região peduncular. (Reversion to green in ripe oranges, and the desiccation of the pulp at the stalk end.) [English summary 12 lines.]

Bol. Inst. Exp. agric. Rio de J., 3, 1942, 31 pp.

The author describes a phenomenon which occurred with the Brazilian orange crop in 1941. After maturity, during the period of summer rains, the fruits turned green again, and the pulp of many became dry, starting at the basal end and often reaching up to one-third of the whole fruit. These disorders are attributed to the abnormal climatic fluctuations, mainly the thermal and moisture conditions, during the season.

1027. SIMONNEAU, P. 634.3-2
 Observations sur le comportement des agrumes en présence du salant. (The behaviour of citrus trees in saline soils.)
Fruits Primeurs, 1945, 15: 259-63.

A full account of the symptoms of malnutrition ending in death of citrus trees gradually assailed by increasing saline conditions, of their immediate cause and of preventive or remedial measures. It is noted as a fact that once defoliation has been caused by salinity in a tree it is more or less useless trying to remedy the position as regards that particular tree. Generally speaking, although remedies are scarce, there are certain palliatives which, under certain conditions, stave off the evil day and are worth trying. Thus (1) Heavy farmyard manuring at 24 to 32 tons to the acre every three years on heavy land has given excellent preventive results. Mineral fertilizers should not include any chloride salts. (2) Irrigation is only safe when adequate drainage is in action. (3) The cutting through of the tap root is advised and is said to result in the increased formation of surface roots. (4) Drainage as a preventive is helpful but as a cure is usually too late.

1028. WEST, E. S. 634.3-2.111
 Frost risk.

Citrus News, 1945, 21: 151.

Certain precautions that can be taken in citrus groves against

light frosts are mentioned, such as avoiding all form cultivation or tillage during the frost period of the year wrapping young trees with newspapers. The only pos method of preventing frost damage, however, is by planned orchard heating.

1029. ANON. 634.31-2.19
 Spotting of valencias.
Citrus Gr., 1944, No. 121, pp. 5-6.

In 1943, the Valencia export season in S. Africa was seriously affected owing to a spotting or browning of the ripe fruit from the end of October onwards and the inability of fruit packed from late September onwards in most areas to stand long storage before shipment. Although the fruit appeared to be perfectly sound on leaving the packhouse, spotting showed up on its arrival at the ports of shipment i.e. within 4 or 5 days. It was widespread in fruit packed for export very late by all Transvaal and Sunday River packers, and was found to a less extent in Kat River and Natal fruit. A trial was carried out with fruit from two orchards that received different treatments before packing and was examined at different times after arrival at Capetown. From the data obtained it was concluded: (1) Tree condition plays an important rôle in the development of the disease. Trees that receive nitrogenous fertilizers and cattle manure regularly do not seem to produce fruit so susceptible to the trouble as fruit from neglected orchards. (2) Wilting before packing fruit susceptible to spotting greatly increased the degree of spotting on packed fruit from the orchard which did not receive sufficient nitrogenous fertilizers or manure. (3) Wilting for 24 hours in the orchard before removing susceptible fruit to the packhouse greatly increased the degree of spotting on the packed fruit from both orchards.

1030. ANON. 634.31-2.19
 Valencia stem end "spot". Incidence of fertilising and sweating.
Citrus News, 1944, 20: 117, 125.

A stem end spotting which, in 1941, seriously affected a whole of the early export valencias from Mildura, S. Australia, is considered to correspond to a disease studied in S. Africa, and the results of the S. African trials are freely quoted.

1031. CAMERON, A. E. 634.31-1.541.11-2.8
 "Tristeza" of seville rootstock.
Citrus News, 1945, 21: 20-1.

It is suggested that a disease of seville orange rootstock in the Mildura district of Victoria (Aust.) may be the same as the tristeza disease of that rootstock occurring in California (H.A., 14: 1836) and elsewhere.

1032. WAHLBERG, H. E. 634.3-2.8
 Scaly bark. . . . The only known cure is elimination.

Calif. Citrogr., 1945, 30: 354-5.

While no cure for psorosis of citrus has yet been devised, bud selection is a means of preventing it. An orchard planted with trees from two nurseries showed visible infection in 38% of its tree population in the west and only 1-8% in the east half. The distribution of diseased trees is indicated on a chart.

1033. SMITH, C. O., AND KLOTZ, L. J. 634.3-2.3
 A more virulent black pit organism on citrus.
Phytopathology, 1945, 35: 942-3.

In some lemon and orange groves of California large (1.5 inch diameter) were found on lemon and Valencia orange fruit. These spots are larger than those typical black pit caused by *Phytoponas syringae* (*Bacterium putrefaciens*, *Bact. citrarefaciens*) but they proved to be the same organism. The maturity of the fruit and virulence of the organisms are believed to determine size of spots.

CITRUS AND SUB-TROPICALS

4. BIGG, I. C. 632.4: 632.96
Fighting fungi—*Trichoderma* against *Rhizoctonia*.
Calif. Citogr., 1946, 31: 114, 140-2, bibl. 4.
 is an account in popular language of the antagonism
trichoderma [*lignorum*] to *Rhizoctonia* [*solani*], a cause
 damping-off of citrus seedlings, and the conditions under
 which it may be used to prevent damping-off. (See also
 , 6: 855.)

5. WAGER, V. A. 634.31-2.4
Black spot in oranges.
Citrus Gr., 1945, No. 140, pp. 1-3, bibl. 8, and
Fmg S. Afr., 1945, 20: 571-6, bibl. 8.
 stated that black spot of citrus (*Phoma citricarpa*
 (Ap.) has been causing serious losses in the mist belt
 natal during the past few years and has recently been
 d in other areas of South Africa. The symptoms of
 diseases are described and illustrated. The oranges are
 gured by the black spots and infected fruit is very subject
 ould; the most important effect of the disease is to
 e the infected fruit to drop off the tree. General
 mmandments for control are: Prune out all dead wood,
 racticable pull off all leaves which show leaf spots. If
 a small portion of the orchard is affected, harvest all
 spotted fruit first. Spray with weak bordeaux mixture
 30 in the home-made formula, or dilute the commercial
 aration about four times. Spray three times: at
 e-quarter petal drop, 6 weeks later, and again 6 weeks
 . The spray should be put on under pressure (about
 lb.) so as to get good coverage of the fruits.

6. CONCEIÇÃO, A. 634.3-2.4
De la gomosis de las citricos y su tratamiento quirúrgico y terapéutico. (Citrus gummosis and its surgical and therapeutic treatment.)
Publ. Univ. nac. Tucumán 251, 1939, 91 pp.,
 25 plates and other figures.
 author describes various surgical operations (root
 ing, removal of diseased portions of the stem and
 aches and the protection of all wounds), and gives
 es for various preparations which can be applied to
 tissues of exposed wounds. Therapeutic recommenda-
 tions include maintaining a soil reaction of pH 6.5-7,
 yses of soil and subsoil and correction of any deficiency
 excess of requisite elements, avoiding manuring for two
 s and after that applying manures in moderation for
 years; in wet soil open trenches for drainage, the use of
 erate irrigation, pruning in early spring, the adoption
 ntrol measures against the usual pests and diseases,
 usion from the orchards of any animals which might
 re the trees, and the use of sour orange as rootstocks.

7. BOYCE, A. M. 634.3-2.6/7
Citrus pest control problems.
Calif. Citogr., 1946, 31: 184-5.
 article deals chiefly with the use of DDT against
 is pests. Good results have been obtained against a
 ber of them, but it is pointed out that heavy infestations
 ed spider often develop shortly after DDT treatment,
 that most of the beneficial parasites and predators of
 ous insects are killed by DDT.

8. SMITH, A. J. 634.3-2.73
The control of citrus thrips.
Citrus Gr., 1945, No. 141, p. 11.
 eriments for the control of citrus thrips [*Scirtothrips*
], using sulphur dust, are described, and the recom-
 mendations based on the results obtained are: At least two
 applications should be made to give satisfactory control,
 first when 75% to 100% of the petals have fallen, and
 second 10 days later. During seasons when a heavy
 infestation is experienced, especially during periods
 when there is little or no young growth for the insects to
 on, an additional third application should be given,
 rwise damage, resulting in russetting or browning of the
 , may result.

1039. OMER-COOPER, J., WHITNALL, A. B. M., AND
 GLAHOLM, J. 634.3-2.752-2.96
Natural control of red scale, *Aonidiella aurantii* Mask.
Citrus Gr., 1946, No. 145, pp. 5-8.
 In this preliminary study on the control of red scale of citrus
 by predator beetles, descriptions are given of 16 species of
 ladybird which are believed to eat red scale, and several
 others have been noted that may do so during a part or
 whole of their life cycle.

1040. LINDGREN, D. L., AND DICKSON, R. C. 632.752: 632.944
Repeated fumigation with HCN and the development of resistance in the California red scale.
J. econ. Ent., 1945, 38: 296-9, bibl. 4, being *Pap. Citrus Exp. Stat. Riverside* 530.
 The results of repeated fumigation with HCN of resistant and non-resistant red scale populations are recorded and the genetical implications discussed.

1041. FULTON, R. A., AND NELSON, H. D. 632.752: 632.944
Use of the blower applicator in fumigation.
Calif. Citogr., 1946, 31: 154, 166-7, bibl. 2.
 For the control of California red scale of citrus, *Aonidiella aurantii* (Mask.), an applicator was devised which atomizes liquid hydrocyanic acid into an air stream created under the tent by a blower. Its use results in more rapid and even distribution of the gas than was obtained with either the liquid hydrocyanic acid applicator (cold-gun) or the vaporizer. Only one-third to half as much hydrocyanic acid was necessary to produce a given kill within gastight (cotton coated with plastic product) tents as in duck tents. A streamlined blower is illustrated by photographs, and by a drawing to show the integral parts.

1042. BIERIG, A. 634.31-2.76
Combate del ahogapollo. (The control of *Macrodactylus*.)
Bol. tec. Cent. nac. Agric. Costa Rica 29, 1942,
 13 pp.
 The genus *Macrodactylus* includes several species known
 collectively in Costa Rica as ahogapollo, and in Mexico as
 fraile. *Macrodactylus suavis* Bates, the species figured and
 described, is a pest of various crops, including oranges.
 It damages the leaves and destroys the flowers, so reducing
 the yield. The method of control recommended is to catch
 the insects in a collecting net. This is held under the end
 of an infested branch where they congregate. The branch
 is struck with a stick to dislodge the insects and cause them
 to fall into the net. A suitable net is described and
 illustrated.

1043. ANON. 634.31-2.78
Arsenate of lead sprays. Effect of quality of oranges. Control of light brown apple moth.
Citrus News, 1944, 20: 121.
 The light brown apple moth [*Tortrix postvittana* Walker]
 has been the cause of increasing damage in recent years to
 both grapes and citrus fruits on individual holdings in the
 Mildura area (Victoria, Aust.). On orange trees the grubs
 shelter between the leaves and fruit which it joins by means
 of its webbing. The moth can be controlled by lead
 arsenate sprays, but there has been prejudice against the use
 of arsenate partly because of the regulations relating to the
 deposit of deleterious substances on the rind of fruit, and
 partly because of the effect of arsenic sprays on fruit flavour.
 The writer quotes the results obtained by Marlton and
 Stofberg on the effect of arsenate sprays on oranges in the
 Transvaal (*H.A.*, 9: 216).

1044. LEWIS, H. C. 632.95
Spray injury from zinc-lime sulphur in central California.
Calif. Citogr., 1946, 31: 112.
 In recent years there has been damage on citrus trees in

CITRUS AND SUB-TROPICALS

central California from using combined sprays of lime-sulphur (for thrips and scale) and zinc oxide (for mottle leaf), and experiments are here described in which various combinations have been used in an attempt to find a suitable one. The results indicate that zinc oxide should not be added to the spring lime-sulphur spray in central California applied following petal fall. If it is desired to use zinc at this time with lime-sulphur, it is recommended that zinc sulphate be used at the rate of 7 lb. per 100 gal. of 2% lime-sulphur. Zinc may be omitted entirely from lime-sulphur sprays in the late spring and a special zinc application made, preferably in the early spring.

1045. MAYADAS, P. 634.3-1.55/56

Preparation and marketing of citrus fruit.

Punjab Fruit J., 1945, 9: 127-30.

Advice on the preparation of citrus fruits for the market is given under the headings: time of picking, method of picking, grading, packing, marketing, and district exchanges. A simple but effective home-made grading device is described and figured. The containers are described and one is shown in fig. 2; the standard size is 26 x 12 x 12 inches for malta orange, with a partition in the middle. The fruit should be packed systematically so that a crate of No. I grade contains 108, No. II 120, No. III 144, and No. IV 200 oranges.

1046. DOOLITTLE, S. P., AND HARTER, L. L.

633.492-2.8

A graft-transmissible virus of sweet potato.

Phytopathology, 1945, 35: 695-704.

A virus disease of sweet potato (*Ipomoea batatas*) causing an unusual type of feathery yellow mottling has been observed in one locality in Maryland. It does not appear to be common in the field. The infected plants are considerably dwarfed but there is no pronounced distortion of the leaves and no necrosis of stems, leaves or roots. The virus has been transmitted by grafting diseased and healthy stems and by the insertion of cylindrical plugs of diseased root tissue into healthy roots. No transmission has been secured by other methods of inoculation and no insect vector is known. The virus produces symptoms distinctly different from those mosaic diseases of sweet potato whose transmission was studied by earlier workers and it is proposed that it be known as feathery mottle of sweet potato. Under the system of generic classification proposed by McKinney it is suggested that it be listed as *Flavimacula ipomoeae* sp. nov. [Authors' summary.]

1047. NUSBAUM, C. J. 633.492-2.8

Internal cork, a new disease of sweet potato of unidentified cause.

Phytopathology, 1946, 36: 18-23.

A new disease of sweet potato, referred to as internal cork, is described. Corky spots occur singly or in groups at any point in the fleshy tissues. There are no external signs except that cavities may form at points where spots occur near the surface. The results presented indicate that neither a culturable pathogen nor boron deficiency is involved, and that the causal agent may possibly be transmitted by diseased roots. It is suggested that it may be a virus disease.

1048. WEBSTER, C. C. 633.85-1.521

Improved planting material of the tung tree.

A progress report.

E. Afr. agric. J., 1945, 11: 165-9, bibl. 2.

The work of improving the planting material of tung trees was begun at the Tung Experimental Station, Nyasaland, in 1940. In spite of the limited period, during which experiments have been carried out and records of plantations made, the tabulated data clearly indicate that budding *Aleurites montana* rootstocks with material from selected best bearers is a very successful means of increasing yields two- and three-fold (in the 4th year) above those of selected and unselected seedlings respectively. In 1942, crossing

and selfing selected trees was begun with the object of producing a number of "legitimate seedling families" the best individuals of which will be propagated vegetatively as a source of improved planting material. None of the several hundred seedlings obtained are yet in bearing, but the first four rainy seasons gave significantly better yields than intercropping with maize, velvet beans or *Calopogonium mucunoides*.

1049. CHAIDZE, I.

633.85

The tung tree (*Aleurites fordii*). [Russian.]
Social. Zemled. (Socialist Cultivation), 1945,
No. 179, p. 4.

The larger plantations of tung trees are situated in Georgian S.S.R. where, before the war, they occupied an area of 16,000 ha. Small plots exist in Azerbaijan in the Krasnodar Province (Soci and Adler Districts). The present time further tests have been made in new districts of Transcaucasia. Two varieties—Chinese *A. fordii* and Japanese *A. cordata*—have been grown on experimental plots. The former variety proved to be the more frost- and drought-resistant and to give greater yields. In district 3-year-old Chinese trees yielded an average of 1.6 kg. of fruit, but not more than 600 g. was obtained from Japanese variety. In 1942 the yields of both varieties were 4.71 and 2.8 kg. per tree. In another district *A. fordii* thrives at an altitude of 500 metres, withstands frost up to -12° C., and yielded an average of 12 and 10 kg. per tree in 1942 and 1944 respectively. It is estimated that thousands of hectares of new plantations can be laid down in Transcaucasia in the districts where neither tea nor citrus can be grown.

1050. YOUNG, R. A.

633.854.5

Bamboos for American horticulture (II) and (III).
Nat. hort. Mag., 1945, 24: 274-91, and 1946,
25: 40-64.

These articles continue the account of bamboos cultivated in the United States; the first article was noted in *Entomol. exp. appl.* 15: 1901. The series are illustrated by photographs. The last illustration shows an entire edible shoot of *Phyllostachys bambusoides* with other shoots peeled and in various stages of being cut up for cooking—in differently shaped pieces.

1051. COLWELL, W. E., AND BRADY, N. C.

634.58-1.811.4

The effect of calcium on certain characteristics of peanut fruit.

J. Amer. Soc. Agron., 1945, 37: 696-708, bibl. 4,
being *Pap. J. Ser. N. Carolina agric. Exp. Stat.*
210.

On soils low in calcium, the use of gypsum increased the proportion of 2-cavity size fruit of the Virginia Bunch and N.C. Runner varieties but not of the Spanish 2B and White Spanish varieties. It was suggested that calcium sulphate exerted this favourable effect by preventing abortion at a very early stage of fruit development before shell enlargement had begun. On soils of higher calcium level, where increases in yield and kernel development in the two former varieties had resulted from calcium addition, gypsum did not increase the proportion of 2-cavity fruit. Thus, it appears that the level of calcium necessary to prevent abortion in the later stages is relatively high in comparison to that to prevent abortion in the early stages. For the varieties tried there was a higher proportion of the 2-cavity size fruits filled than of the 1-cavity size. The use of gypsum increased the average weight of peanut kernels. With all treatments combined, the average weight of kernels from 2-cavity fruits wherein both ovules developed were smaller than corresponding weights of kernels from fruits in which only one ovule developed. [From authors' summary.]

52. COLWELL, W. E., BRADY, N. C., AND PILAND, J. R. 634.58-1.8 Composition of peanut shells of filled and unfilled fruits as affected by fertilizer treatments. *J. Amer. Soc. Agron.*, 1945, 37: 792-805, bibl. 4, being *Pap. J. Ser. N. Carolina agric. Exp. Stat.* 211.

Previous work had shown that the composition of the nut shell is more sensitive to nutrient supply than that of the kernel. In these experiments, carried out with varieties at two locations, separate analyses were made of filled and unfilled fruit in order to associate chemical composition more closely with ovule abortion. Ferent nitrogen, potassium and magnesium treatments, though influencing yield and fruit quality, did not produce effect on the nitrogen, potassium and magnesium content of the shell. However, calcium applications to the shell were found to increase markedly the calcium content of the shell. Kernel development, on the other hand, was related to calcium content of the shell. The content of all constituents examined, with the exception of calcium, was higher in the kernel than in the shell.

53. BLEDSOE, R. W., HARRIS, H. C., AND CLARK, F. 634.58-1.811.7 The importance of peanuts left in the soil in the interpretation of increases in yield due to sulphur treatments. *J. Amer. Soc. Agron.*, 1945, 37: 689-95, bibl. 18.

Sulphur treatments did not significantly affect total peanut yields. The prerequisites for correctly evaluating results obtained in peanut trials are discussed.—Florida Agricultural Experiment Station.

54. MORWOOD, R. B. 634.58-2.4 Peanut diseases. *Qd agric. J.*, 1945, 61: 266-71.

Notes on symptoms and control are given for seedling blight

55. MONCURE, R. C. 551.566.1 Agricultural collaboration in Nicaragua. *Agric. Amer.*, 1946, 6: 10-11, 14.

A brief report on the activities of the Nicaraguan co-operative experiment station at El Cerro, which include experimental plantings of *Hevea* rubber, African oilpalm, cacao, icá, citronella, nutmeg, vanilla, ginger and other crops. The station is located at Cukra Hill. Eastern Nicaragua is one of the few areas in the Western Hemisphere where the American leaf blight of *Hevea* has not made an appearance.

57. ALVIM-CARNEIRO, P. de T. 612.014.46: 581.1 Plantas venenosas e sua ocorrência em Minas Gerais. (The poisonous plants of Minas Geraes.) *Ceres*, 1945, 6: 221-56, bibl. 22.

After three pages of introduction a list, in alphabetical order of Brazilian common names, is given of 45 poisonous plants of the state of Minas Geraes. Under each is mentioned the family, the scientific name, chief characters of the plant, its principal toxic substance. Then follows an index of the scientific names and synonyms of the common names.

58. FRISON, E. 676.2: 633/635 La production éventuelle de pâtes à papier au Congo belge. (Present day paper sources in the Belgian Congo.) *Bull. agric. Congo belge (Bruxelles)*, 1944, 35: 183-204.

A discussion of 41 plants including trees, shrubs and fibres which have been used as a source of paper in Belgium followed by a list of forest trees from the Congo which, it is thought, are likely to afford a more permanent and satisfactory source of paper.

and crown rot (*Aspergillus* sp.), wilt (*Fusarium* sp. or *Verticillium* sp.), leaf spot (*Cercospora personata* and *C. arachidicola*), and virus diseases. Several diseases present in peanut in Queensland are considered, because of their general behaviour, to be virus diseases, and are known respectively as chlorosis, bunchy plant, and leaf curl; chlorosis and bunchy plant are widespread in their incidence, but they have never affected any large proportion of a crop.

1055. ARNDT, F. R. 634.3 a Citrus culture [in South Australia]. XIV.—The fertilization of citrus trees. XV.—Bulk organic manures as fertilizers for citrus trees. XVI.—Cover crops. *J. Dep. Agric. S. Aust.*, 1940, 44: 145-53.

XVII.—The pruning of citrus trees. XVIII.—Salt and seepage problems. *Ibidem*, 1941, 45: 213-7.

XIX.—Harvesting and packing of citrus fruits. *Ibidem*, 1941, 45: 307-9.

b JOHNSTONE, J. C. 634.3-1.542 Pruning citrus trees. *Calif. Citrogr.*, 1946, 31: 146.

c PELEGRI, G. 633.492(65) Culture de la patate douce en Algérie. (Sweet potato growing in Algeria.) *Bull. Inspect. gén. Agric. algér.* 104, 1944, pp. 4. Including storage.

d QUINN, N. R. 634.3-2.191 A chlorotic condition of citrus trees. Preliminary note on correction by means of sprays containing manganese. *J. Dep. Agric. S. Aust.*, 1941, 45: 39-40.

TROPICAL CROPS.

56. MONCURE, R. C. 551.566.1 Agricultural collaboration in Nicaragua. *Agric. Amer.*, 1946, 6: 10-11, 14.

A brief report on the activities of the Nicaraguan co-operative experiment station at El Cerro, which include experimental plantings of *Hevea* rubber, African oilpalm, cacao, icá, citronella, nutmeg, vanilla, ginger and other crops. The station is located at Cukra Hill. Eastern Nicaragua is one of the few areas in the Western Hemisphere where the American leaf blight of *Hevea* has not made an appearance.

57. ALVIM-CARNEIRO, P. de T. 612.014.46: 581.1 Plantas venenosas e sua ocorrência em Minas Gerais. (The poisonous plants of Minas Geraes.) *Ceres*, 1945, 6: 221-56, bibl. 22.

After three pages of introduction a list, in alphabetical order of Brazilian common names, is given of 45 poisonous plants of the state of Minas Geraes. Under each is mentioned the family, the scientific name, chief characters of the plant, its principal toxic substance. Then follows an index of the scientific names and synonyms of the common names.

58. FRISON, E. 676.2: 633/635 La production éventuelle de pâtes à papier au Congo belge. (Present day paper sources in the Belgian Congo.) *Bull. agric. Congo belge (Bruxelles)*, 1944, 35: 183-204.

A discussion of 41 plants including trees, shrubs and fibres which have been used as a source of paper in Belgium followed by a list of forest trees from the Congo which, it is thought, are likely to afford a more permanent and satisfactory source of paper.

1059. SCHOFIELD, J. L. 631.874 A comparison of soil nitrate nitrogen values under bare fallow and after ploughing in various perennial tropical legumes and cowpeas. *Qd J. agric. Sci.*, 1945, 2: 170-89, bibl. 25.

Four perennial tropical legumes—*Calopogonium mucunoides* (calopo), *Centrosema pubescens* (centro), *Pueraria phaseoloides* (puero) and *Stylosanthes guianensis* (stylo)—after 18 months' growth were ploughed under in July at South Johnstone, on the wet tropical coast of Queensland, and soil nitrate nitrogen values were determined in four layers to a depth of 24 inches over the ensuing seven months. The mean nitrate nitrogen values for the puelo plots at each depth were significantly higher at the 1% level than the corresponding values for the other plots. In the top six inches of the puelo plots, the mean value was 171.8 p.p.m., and the maximum was 395.6 p.p.m. in early October. The effects of yield, chemical composition of the plant material, soil moisture and temperature on nitrate nitrogen production are discussed. A high positive correlation between precipitation and leaching of nitrate is shown. Comparison with a ploughed-in area of giant cowpeas showed that only puelo was superior to cowpeas in soil nitrate production. Under bare fallow, nitrate nitrogen production was not detected until mid-August and was slow until mid-September. The maximum content of 108.0 p.p.m. in the top six inches was reached in mid-January, and the mean value in that layer over seven months was 34.4 p.p.m. The importance of perennial legumes as soil improving plants in the tropics is stressed and the particular value of puelo and centro is indicated. The implications of nitrate nitrogen production under bare fallow in relation to pasture and crop growth are discussed.

TROPICAL CROPS

1060. KINCAID, G. C. 631.875
 Ensayo de producción de compost en Costa Rica. (A trial on the production of compost in Costa Rica.)
Bol. Tec. Dep. nac. Agric. Costa Rica, 48, 1944, 13 pp.

It is pointed out that certain regions in Costa Rica are losing their value for crop production because the soil is becoming depleted of the necessary chemical elements. The use of compost is suggested as a means of restoring the fertility, and trials are described and illustrated on the preparation of compost by the "Indore Process" (see *H.A.*, 6: 430), making use particularly in this case of the waste from coffee plantations.

1061. LEVER, R. J. A. W. 633/635: 632.6/7
 Insect pests of some economic crops in Fiji.
Bull. ent. Res., 1945, 35: 367-77, bibl. 7.

The crops (in alphabetical order), under which the insect pests in the Fiji Islands are listed, include a large number of horticultural and plantation crops.

1062. HAMBLETON, E. J. 632.796
 The leaf-cutting ant problem in the Americas.
Agric. Amer., 1945, 5: 123-5, 135.

Cultivated crops growing next to woodlands suffer most severely from leaf-cutting ants in tropical and subtropical America. The biology of the pest is discussed. A co-operative effort is the only hope of coping with the menace effectively.

1063. HAMBLETON, E. J. 632.796
 El exterminio del zompopo. (The extermination of leaf-cutting ants.)
Rev. Agric. Guatemala, 1945, 1: 593-7.

The author describes the nests of leaf-cutting ants and measures for destroying the nests, particularly by fumigation with carbon bisulphide, sulphur and arsenic (see also *H.A.*, 15: 1923). Recommended for this purpose is a mixture of sulphur and arsenic in the proportions 3:4, the mixture being effective against both the cultivated fungus and the ants themselves; the bellows method of applying it is mentioned. (See No. 1065.)

1064. BIERIG, A. 632.796
 La lucha con la zompopa. (Combating leaf-cutting ants.)
Bol. tec. Dep. nac. Agric., Costa Rica, 1941, 22 pp.

This is a general account of the leaf-eating ants of the genus *Atta*, their systematics and biology, with illustrations taken mostly from works of other observers. Measures for controlling the ants are discussed with special reference to the Squier pump. This is a kind of portable bell, with a ventilator fan above producing a current of air which passes downwards. When in action it is placed over a nest. Within it are put charcoal and the chemical fumigant (flowers of sulphur or arsenic powder); these when ignited give off fumes which are forced under pressure from the apparatus into all the tunnels of the nest.

1065. ANON. 632.796
 Exterminador de hormigas de tipo fuele. (Exterminating ants by the bellows method.)
Rev. Agric. Guatemala, 1945, 1: 598-600.

This account, from an article by M. Autuori in *O Biológico*, São Paulo, 1936, 2 (8): 266-9, describes and illustrates by drawings a bellows apparatus for use in applying fumigants for the destruction of ants' nests. It consists essentially of a cylindrical (conical at one end) heater, in which the fumigant is ignited, attached to a bellows for forcing the fumigant into the nests.

1066. KHAN, M. H. 632.728
 Driving hopper-bands of desert locust to the trenches.
Ind. Fmg., 1945, 6: 296-9.

Of the methods of control tried against the locust the trenching method has proved not only the safest but the most practicable one over vast desert areas, but it is not effective in tracts with a hard or rocky soil. Improvements in the method have been made during the last few years and these are discussed under (1) selection of site, (2) manipulation of the control party for digging the trench and encircling a band, (3) the size and type of a trench, (4) method of driving a band into the trench. The posting of men of a control party for a driving operation is shown diagrammatically.

1067. RAHMAN, K. A., AND LATIF, M. A. 632.752
 Description, bionomics and control of the giant mealybug, *Drosicha stebbingi*, Green (Homoptera; Coccoidea).
Bull. ent. Res., 1944, 35: 197-209, bibl. 22.

The giant mealybug, *Drosicha stebbingi*, is a serious pest with wide distribution in the Punjab. It feeds on 62 plants, which mango, citrus, "ber" and guava suffer the most. All stages of the insect are described in detail. The various control measures suggested by previous investigators were tried out on a field scale, but did not give satisfactory results. Black oilcloth and a new sticky material, "Namhan", proved the most effective types of banding. The form and method of preparing the latter material are described in detail. [From authors' summary.]—Punjab Agricultural College and Research Institute, Lyallpur.

1068. MARSHALL, G. A. K. 632.76
 New injurious Curculionidae from Africa.
Bull. ent. Res., 1944, 35: 43-8.

Including: *Protostrophus hirtiventris*, sp.n., attacking groundnut plants, young maize and granadillas; *Scolochitona armipes*, gen. nov., sp.n. (subfamily *Brachyderinae*); *Chelyophyes hemisphaericus*, gen. nov., sp.n. (subfamily *Otiorrhynchinae*), attacking leaves of cacao.

1069. FENNAH, R. G. 632.951
 Preliminary tests with DDT against insect pests of food-crops in the Lesser Antilles.
Trop. Agriculture Trin., 1945, 22: 222-6.

Cage tests carried out in St. Lucia, B.W.I., demonstrated the efficacy of DDT sprays against a large number of insect pests, including some 25 vegetable and citrus pests, mortality percentage after exposure to DDT residue 24, 36 and 48 hours being tabulated. Field trials on a larger scale confirmed the results of cage tests against the green stink-bug (*Nezara viridula*), the cabbage butterfly (*Ascia monuste*), the diamond-backed moth (*Plutella maculipennis*) and *Thermisia gemmatalis*, a common pest of cow-peas. Moderately heavy showers were found to reduce seriously the residue of DDT emulsion deposited by a hand atomizing sprayer, while the larger spray aggregates obtained from applications with a knapsack sprayer proved more desirable under Lesser Antilles wet-season conditions.

1070. FROMM, F., AND VIDAL, I. 632.954
 The chemical control of Bermuda grass and of crowfoot grass.
Rev. Agric. Puerto Rico, 1944, 35: 240.

Experiments were carried out on the control of Bermuda grass (*Cynodon dactylon*) and crowfoot grass (*Eleusine indica*) using ammonium sulphamate and calcium cyanate. The authors conclude that 1.25 m. CNS- at the rate of 1.25 m. ammonium sulphamate controls Bermuda grass effectively if applied at the rate of 0.6 to 1 litre per square metre in the dry season. 1.25 m. CNS- at the rate of 1 litre per square metre will eradicate crowfoot grass only if the grass is previously cut.

1071. CLIBBENS, D. A. 633.513
 A comparative study of some properties of kapok.
Bull. Imp. Inst., London, 1945, 43: 180-209.

The term kapok, as used in this paper, is confined to *Eriodendron* or *Bombax* species cultivated or wild. The microscopical and physical properties are described

amples from various sources, with particular reference to
yancy. It is shown that kapoks can be obtained from
trees other than Java of such a quality as to be indistin-
guishable, after suitable processing, from Prime Java kapok
in any of the properties examined here.

2. CONDE THILLET, M. L. 633.681
El cultivo de la yuca. (The cultivation of
yuca.)

Rev. Agric., Puerto Rico, 1944, 35: 166-9.

yuca, sweet cassava or manioc [*Manihot aipi* Pohl] is
of South America. For its cultivation the following
ice is given: Select soil which is deep, light, moderately
ile and well drained. Select varieties that have a high
d and are in good demand on the market. The ground
uld be well tilled and smooth. The distances recom-
med for sowing the seeds are 24×36 in., 36×36 in.,
48 in., or 48×48 in. according to the variety and the
e of soil. The use of dung and chemical manures in
ill amounts is recommended, using larger amounts in
or soils. Keep the plantation free from weeds; as soon
e plants cover the ground, tilling the soil should cease.
best method of controlling the diseases of the yuca is
grow vigorous and resistant varieties. The method of
vesting the crop depends on the type and size of the
nd, the economic measures at the disposal of the
er, the demands of the market, etc., but it is important
void injuring the fruit during harvesting.

3. ADRIAENS, L. 633.681-1.56

Note sur la toxicité et la préparation du manioc
du Congo belge. (Note on the toxicity and
preparation of cassava.)

Bull. agric. Congo belge (Bruxelles), 1942, 33:
332-51.

consideration of the best methods of eliminating any
ous danger due to the liberation of HCN from cassava.
ts show that the best antidote to HCN is glucose.
ten all in all it is thought that much difficulty will be
ided by proper attention to the raw product before its
val on the European market. A suitable method of
paring the roots in the form of "colettes" or "boun-
ns" is described.

4. CHOWDHURY, S. 632.4: 633.685

A *Rhizoctonia* leaf blight of *Dioscorea*.

Curr. Sci., 1946, 15: 81-2.
leaf blight of yam (*Dioscorea alata*) is caused by *Rhizoc-*
a solani. The symptoms, appearing first on the lower
es in contact with the soil, are water-soaked areas which
gress rapidly over the leaf; more or less concentric,
t and dark brown zones are often observed.

5. POLLACCI, G., AND GALLOTTI, M. 633.72

La coltura del tè in Italia. (Tea growing in
Italy.)

Libri dell' Agricoltore* 9, 1942, pp. 33, L. It. 4.50.
he 200 tea plants (*Camellia thea* Link. var. *ticinensis*)
ed by the authors from seed of plants which had survived
1 winters in the Botanical Garden of Pavia were planted
at Pavia, while it was proposed to distribute about twice
number among firms and private estates interested
subject to climatic conditions which appeared to be
st favourable to tea growing. The Northern Italian
es appeared to offer the best conditions and it was
ded to form a tea nursery on Lake Como in collaboration
n the Villa Carlotta authorities. Notes are also given
methods of processing.

6. SHRIKHANDE, J. G. 631.874: 633.72

The biological decomposition of green manures.

I. Carbon-nitrogen transformation during
decomposition.

Ind. J. agric. Sci., 1945, 15: 95-103, bibl. 26.
omposition of green manures and other suitable material

Publishers Società anonima Editrice Dante Alighieri
oa, Rome and Naples.

for composting on tea estates in Ceylon has been studied.
The composition of various materials examined shows that
the carbon-nitrogen ratio of all the green manures is in the
neighbourhood of 12: 1, a ratio obtained in a compost of an
average vegetable material. All the green manures finished
with a negative nitrogen factor with ready ammonification
of the plant protein, with the exception of tea leaf.
The leaf with its normal decomposition and negative
nitrogen factor failed to produce any ammonia, suggesting
that the loss is perhaps due to elementary nitrogen. [From
author's summary.]

1077. MENDES, A. J. T. 633.73: 576.312.32

Citologia de coffeea. (Cytology of coffee.)

Rev. Agric., São Paulo, 1945, 20: 412-5.

Polyplody in the genus *Coffea* is based on $x=11$. There
are diploids ($2n=22$) such as *C. canephora*, *C. diewebrei*,
C. liberica and *C. congensis*, but *C. arabica* is a tetraploid
($2n=44$). In nurseries of *C. arabica* occur varieties with
 $2n=88$ and $2n=66$ chromosomes. Polyplody can be
duced by treating seeds or buds with very weak solutions
of colchicine. Another method suggested is to take
recently-cut branches and place their cut ends in solutions of
colchicine in small flasks so that the solution is absorbed at
the cut surfaces; the branches are then grafted on to
appropriate rootstocks. Hexaploid branches are obtained
in this way from triploid material and tetraploid branches
from diploid material.

1078. MENDES, A. J. T., AND BACCHI, O.

633.73: 576.3

Observações citológicas em coffeea. Uma varie-
dade haploide ("di-haploide") de *C. arabica*.
(Cytological observations on *Coffea*. A haploid
variety of *C. arabica*.)

J. Agron. S. Paulo, 1940, 3: 183-206, being
Bol. tecnol. Inst. agron. Estado de S. Paulo 77,
26 pp., bibl. 20.

One of the main features of *Coffea arabica* L. var. *mono-*
spuma Ottolander et Cramer is a high sterility; the plants
bear very little, the fruit being always one-seeded, although
they blossom freely. Monosperma plants are accidentally
found among seedlings in the nursery of the cultivated
varieties *bourbon* and *typica* (both pertaining to *C. arabica*
L.). While most of the *C. arabica* varieties (including
bourbon and *typica*) are tetraploid ($2n=44$), the authors
have found that *monosperma* plants have but 22 somatic
chromosomes. Many irregularities have been found in
their microsporogenesis, details of which are given. The
one-seeded fruits which are occasionally formed are the
result of the fertilization of only one of the two ovules of
the ovary. It is concluded that egg-cells with 22 chromo-
somes are fertile. This *monosperma* variety should be
classified as "di-haploid", according to Ivanov's classifica-
tion of the haploids. [From authors' summary.]

1079. SWAMY, R. L. N.

633.73: 575.252

Brief note on somatic variation in "Kents"
strain of *Coffea arabica* L.

Curr. Sci., 1946, 15: 80-1.

Describes a mutant shoot arising on a "Kents" scion of a
grafted coffee plant. Its leaves are broader at the base,
thicker and coarser in texture than normal, and crinkled.
The flowers have broader corolla lobes. No fruits have
developed on the mutant.

1080. PORTÈRES, R.

633.73 + 633.88.51 + 634.6

Le niveau de base de la culture du caféier d'Arabie
et des arbres à quinqua dans les zones monta-
geuses forestières de Guinée française et de Côte
d'Ivoire. (Altitudes suitable for arabica coffee
and cinchona cultivation in mountain forest zones
of French Guinea and the Ivory Coast.)

Agron. trop., 1946, 1: 28-33.

Observations on the performance of arabica coffee and of

cinchona show that the lowest limit of successful performance in latitudes of $7^{\circ} 1/2$ N. to $9^{\circ} 1/2$ N. lies at about 800 metres, but that the actual altitudes are less important than climatic conditions. Observations on natural flora at altitudes of 500 to 1,200 metres are being collected and will, it is thought, give valuable pointers to the probable success of cinchona and coffee. A consideration of the natural occurrence and growth of the oil palm, *Elaeis guineensis*, shows that its maximum frequency occurs between 550 and 600 metres, whereas at 700-750 metres its occurrence is extremely rare. It is concluded that an altitude of about 800 metres signifies the complete disappearance of the oil palm and the start of cinchona and arabica coffee areas.

1081. ANON. 633.73-2.5

Cultivation on coffee estates.

Mon. Bull. Coffee Bd Kenya, 1945, 10: 116-8.

Cultivation and weed eradication by manual labour has so far been the most satisfactory method of coping with weeds in coffee. The development of the labour problem, however, makes mechanical or chemical weed control a necessity in the future. A number of implements, manufactured by different firms, are discussed with regard to their suitability for the purpose. Three officers of the Coffee Services state their views in an appendix. The Officer in Charge is optimistic, hoping that an implement superior to manual labour will be invented; the Plant Physiologist's contribution is characterized by a note of caution (cultivation may damage the surface roots of mulched coffee); and the Soil Chemist stresses the need for contour strip cultivation.

1082. HALCROW, M. 633.73

Conditions in the western area of Kenya.

Mon. Bull. Coffee Bd Kenya, 1945, 10: 94, 99.

The report of a fortnight's tour made through the coffee area of western Kenya in August and September 1945. The observations noted include the following points: It is advantageous to establish a mixture of leguminous tree species as shade trees. If one sort happens to be defoliated by its particular insect pest, there will always be some protection afforded by the other species. The right type of leguminous shade trees may also have a considerable manorial value and a particular case is instanced. The position in respect of pests and diseases, covered in some detail, is on the whole satisfactory in the western area, but manure supply has been insufficient during the war years. At two estates, where plenty of boma manure was available, the crop has been very heavy.

1083. COELHO DE SOUZA, W. W. 633.73

Situação do café. (The situation with regard to the coffee crop.)

Bol. Superintend. Serv. Café, São Paulo, 1944, 20: 771-6.

The causes of the diminishing yields of coffee in Brazil are discussed with particular reference to the lack of humus in the soil. It is recommended that leguminous plants be used as cover crops. The value of providing shade in coffee plantations is considered as doubtful.

1084. BARRETT, R. W. 633.73

Mechanization of field work on a coffee plantation.

Mon. Bull. Coff. Bd Kenya, 1946, 11: 5-8.

Weeding, sub-soiling, soil conservation work, and spraying with bordeaux mixture and for thrips control, comprise the principal operations for mechanization, but, in addition, other possibilities are opened up such as growing and turning in a green cover crop during the long rains. The old method of disc cultivation as a means of weed control has given place to implements with power-operated, revolving tines which, if properly set, do not touch the main lateral roots, and do little damage, if any, to the smaller feeder roots. Any form of mechanical cultivation levels down the system of contour ridges. With the small rotary hoe it is desirable beforehand to knock down the steeper ridges,

although in cases where they are broad-based, the machine will mount up and over. The rebuilding and making up of contour ridges by mechanical implements is possible if the planter is prepared to sacrifice a few coffee trees, and a scheme for dealing with soil conservation will be the subject of future trials. A schedule shows performance and working costs with three different methods of spraying coffee with bordeaux mixture, viz. headland pumps, hand pumps, and power sprayer.

1085. GILBERT, S. M. 633.73-1.875

The mulching of *Coffea arabica*.

E Afr. agric. J., 1945, 11: 75-9.

The paper summarizes the knowledge gained on the use of mulches of *Pennisetum purpureum*, *Panicum maximum*, *Hypperrhenia* sp. and dead banana leaves for *Coffea arabica*. Tables and graphs show that mulching has the beneficial effect of (1) conserving soil moisture, (2) preserving a more uniform temperature in the soil, (3) increasing soil nitrate content, (4) reducing soil erosion, (5) reducing weed growth and (6) increasing yields. The cost of mulching is also worked out.

1086. NEIME, N. A. 633.73

Culturas acessórias na fazenda de café. IV. Feijão. (Accessory crops on coffee estates. Beans.)

Bol. Superintend. Serv. Café, São Paulo, 1945, 20: 661-4.

It is claimed that French beans are suitable as an accessory crop on coffee estates in Brazil. The article includes notes on suitable soils, varieties recommended, sowing, cultivation and harvesting.

1087. CORREA, A. 633.73-1.8

El uso de abono orgánico en los cafetos. (The use of organic manures in coffee fields.)

Rev. Agric. Puerto Rico, 1944, 35: 132-9.

This article starts with a general account of the function of organic substances in the soil, and of the impoverishment of the coffee plantations of Puerto Rico by continuous cultivation of coffee without supplying the necessary humus. Among the organic substances available for conversion into manure are dung, coffee pulp, vegetable trash of various kinds, sweepings, green manure crops, vegetable animal remains, sugar-cane scum, sediment from streams. The preparation of manures from coffee waste and from sugar-cane scum comes in for special mention.

1088. CORREA, A. 633.73-1.8

Preparación y utilización de la pulpa del café como abono orgánico. (The preparation and utilization of coffee pulp as organic manure.)

Rev. Agric. Puerto Rico, 1944, 35: 140-3.

The impoverishment of the soil of Puerto Rico by continuous cultivation and by erosion makes necessary the use of organic manures. The value of coffee pulp for this purpose is emphasized (see No. 1088). The pulp forms about $\frac{1}{4}$ of the coffee berry and is rich in nutritive substances. Analyses of the fresh pulp and of its ash show that employing the pulp as manure will result in returning to the soil about a quarter of the phosphoric acid, half of the potash and a little more than a quarter of the nitrogen that the coffee trees need for ripening their berries. The pulp and the parchment resulting from the separation of the beans from the berries should not be used fresh or incompletely fermented. The best types of fermenting pits are described and figured. The best period for applying the fermented pulp to the soil is during May and June when rain is abundant.

1089. KRUG, H. P. 633.73-2.4

Concepção moderna sobre a origem dos cafés duros. (Modern ideas on the cause of harsh coffees.)

Rev. Agric. São Paulo, 1945, 20: 416-26.

The author finds that harshness in the flavour of coffee is associated with the presence in the coffee bean of var-

ro-organisms, chiefly *Fusarium concolor*, the degree of shness being roughly in proportion to the number of cted beans in a sample.

0. M., W. W. 633.73-2.44

Hemileia vastatrix in India.

Plant. Chron., 1945, 40: 384-7.

major reasons for the survival of a sound coffee industry in South India are (1) The seasons are more strongly marked than in Ceylon. (2) In South India coffee has been consistently cultivated under an overhead shade canopy which checks spore production and distribution. (3) South India has two strains of Arabica coffee which are less susceptible to *Hemileia* leaf disease than the original strain. These two strains Kents is more resistant than Coorg. The difference in their behaviour with respect to *Hemileia* has been shown by the writer to rest on the existence of biological strains of the fungus to which the coffee types react differently.

1. HALCROW, M. 633.73-2.752

The mealybug position.

Mon. Bull. Caff. Bd Kenya, 1946, 11: 4.

coffee mealybug [*Pseudococcus kenyae* (see H.A., 13: 4)] is more prevalent in Kenya now than it has been several years past and a few of the outbreaks have taxed all efforts to clear them up quickly. The mealybug-antagonist-parasite complex is discussed with reference to such outbreaks. Generally speaking, the parasites are very parasitizing mealybug throughout the main coffee area and there are more estates where the mealybug is known to be under complete control than where serious outbreaks appear to exist.

2. BERGAMIN, J. 633.73-2.76

O sombreamento dos cafèzais e a "broca do café". (Shading coffee plantations in relation to the coffee borer.)

Rev. Dep. nac. Café (D.N.C.), Rio de J., 1945, 13: 627-38.

The relation between infestation by the coffee berry borer [*Hypothenemus hampei*] and rainfall is discussed. Data presented to show that the total rainfall of the drier months of the year (May and September) has a fundamental influence on the development of the borer in the following year; a very high rainfall in 1941 was followed in 1942 by infestation, and an abnormally low rainfall in 1944 by a slight infestation in 1945. It is inferred that the beetles thrive better in shade than in the open field, and that shading therefore is disadvantageous in Brazilian coffee growing.

3. BERGAMIN, J. 633.73-2.76

Broca do café. (The coffee berry borer.)

Rev. Agric. São Paulo, 1945, 20: 427-30.

note on the coffee berry borer [*Hypothenemus hampei* (see 4, 16: 467)] and its control. The introduction of a tachinid wasp yielded some initial success but its range in Brazil was limited to a zone between 22°30' and 24°S. Shading is considered as favourable to the borer.

4. MELLO, P. S. 633.73

Restauração dos cafèzais. VII and IX. (Restoring coffee cultivation.)

Rev. Dep. nac. Café (D.N.C.), Rio de J., 1945, 13: 473-6, 639-42.

These two articles form parts of a series devoted to a discussion on the decline of coffee growing in Brazil, and suggesting plans for its restoration. They discuss the use of shade plants in coffee growing, particularly with reference to the competition between the roots of the coffee plants and those of shade plants. Advice is given on the care necessary in the nursery and on the precautions to be taken during replanting.

1095. CHEESMAN, E. E. 633.74

Informe relacionado con una visita a los distritos cacaoteros del Ecuador y sobre las investigaciones científicas necesarias para cualquier rehabilitación de la industria. (Report on a visit to the cacao districts of Ecuador and on research necessary to re-establish industry.)

Bol. Dep. Agric. Ecuador 23, 1943, 31 pp.

The reduction of the cacao crop of Ecuador to about a quarter of that of 1916 is attributed mostly to the witch-broom and monilia diseases. The effect of these diseases has been aggravated by the decrepitude of the plantations and want of attention. A partial rehabilitation of the industry depends on the control of the two diseases and this in turn depends on the utilization of trees that show natural resistance to the diseases. On various farms in Ecuador there are trees which appear to show resistance. These should be propagated not from seed, but by cuttings in order to preserve their characteristics. Recommendations for future research are outlined.

1096. HUMPHRIES, E. C., AND RODRIGUES, G. 633.74

Decomposition of cacao leaves under natural conditions.

J. agric. Sci., 1945, 35: 247-53, bibl. 8.

The immediate object of the investigation, carried out as part of a general study on the soil organic matter of cacao estates in Trinidad, was to follow the rate of decomposition of cacao leaves *in situ* and to trace the course of the cycle normally taking place in a cacao field. The experiments were designed to yield information on the absolute changes in leaf components, as opposed to relative changes, to which most studies of this kind have hitherto been confined. The results indicate that under tropical conditions cacao leaves decompose very rapidly, irrespective of season. The amount of dry leaves falling on one acre was found to vary according to time of year. During the dry season it was estimated to be 2 tons in 2½ months, in another experiment ½ ton in 4 months. On the basis of these figures and of the figures obtained for loss of potash, which is particularly rapid, it is calculated that 11-45 lb. of K_2O per acre are apparently leached into the soil. No estimate can be made in respect of the amount of nitrogen transferred to the soil. The absolute changes in other organic and mineral constituents of cacao leaves are recorded and a method is described by which these changes may be followed.—Imperial College of Tropical Agriculture, Trinidad.

1097. ALIBERT, H. 633.74-2.8

Note préliminaire sur une nouvelle maladie du cacaoyer, le "swollen shoot". (A preliminary note on swollen shoot of cocoa.)

Agron. trop., 1946, 1: 34-43, bibl. 19.

This note is based largely on work already reported by Posnette, Hancock and others on swollen shoot in cocoa, in the Gold Coast and elsewhere. Whereas it has as yet not been found in Togoland it has already appeared in the Ivory Coast. Control measures include elimination and burning of affected trees and treatment of surrounding ground with insecticides to control possible vectors, use of resistant varieties, if such can be found, and possibly the use of material hardened by growing under peculiar conditions of altitude or climate. Dr. P. Lépine of the Pasteur Institute at Paris is working on ways and means for making an early diagnosis of swollen shoot possible. His results will be tested at the Centre de Recherches d'Abengourou, in the Ivory Coast.

1098. LAING, F. 632.752: 633.24

A new injurious mealy-bug from the Gold Coast.

Bull. ent. Res., 1944, 35: 91-3.

Pseudococcus exitiosus, sp.n., occurring on cacao, reported to be one of the coccid vectors of swollen-shoot disease.

1099. BRYANT, G. E. 632.76: 633.74
Two injurious species of phytophaga (*Halticinae*)
from the Ivory Coast.
Bull. ent. Res., 1944, 35: 141-2.

Poephila flaveola, sp.n., on *Onchoba echinata* (the source of gorli seeds) and *Jamesonia theobromae*, sp.n., on cacao leaves.

1100. MACFIE, J. W. S. 633.74-2.7
Ceratopogonidae collected in Trinidad from cacao flowers.
Bull. ent. Res., 1944, 35: 297-300.

Six species are described. The insects are thought to be of importance in the pollination of cacao flowers.

1101. PENNINGTON, C. 633.821: 581.162.3
Vanilla pollination is no mystery.
Rev. Agric. Puerto Rico, 1944, 35: 223-33.

In this article the author says that pollinating is one of the simplest, if not the simplest of all practices in vanilla culture and guarantees to teach the technique in five minutes to any boy or girl of average intelligence. The structure of the vanilla flower and the specialized pollinating mechanism are described, and illustrations show the situation and form of the floral organs concerned in natural pollination. The method of artificial pollination recommended is the "blind method", which is described in detail and illustrated by close-up photographs, showing four "movements": I. Two petals and one sepal are held firmly between the index and second fingers of the left hand, the index finger supporting the column. The pollinating splinter bears downward and toward the pollinator and tears the labellum from the column. II. The splinter moves upward, engages the rostellum and raises it up and backward, thus exposing the stigma. III. The thumb of the left hand presses the anther containing the pollen down upon the stigma. IV. The pollination has been completed; the splinter has been withdrawn; the anther is shown adhering to the stigma.

1102. UPPAL, B. N., VERMA, P. M., AND CAPOOR, S. P. 633.83-2.4
A mosaic disease of cardamom.
Curr. Sci., 1945, 14: 208-9, bibl. 3.

Mosaic of cardamom (*Elettaria cardamomum* Maton), also known as "katte" or marble disease, is a serious disease extending over a wide area in India; it occurs in Travancore, Mysore and North Kanara. The first visible symptoms of the disease are a general chlorosis of the entire leaf with slender interrupted stripes of deep-green tissues over its surface. When the disease is fully developed the stripes of green tissue are almost evenly distributed over the leaf, presenting a characteristic mosaic pattern. All attempts to transmit the disease by sap inoculation have so far been unsuccessful, but experiments have shown that it can be transmitted by the aphid *Pentalonia nigronervosa*, the insect vector of bunchy top disease of bananas.

1103. SPIELMAN, H. W. 633.85
Menthol comes to the Hemisphere.
Agric. Amer., 1945, 5: 166-8.

Japanese mint is now grown in very large quantity in Brazil, particularly in the western third of São Paulo, and supplies the U.S. market. A large part of the menthol production is in the hands of Japanese growers.

1104. PANSE, T. B., AND SREENIVASAN, A. 577.16: 633.85
Stability of vitamin C in drumstick leaf.
Curr. Sci., 1945, 14: 303-4, bibl. 13.

The authors review previous work on the vitamins of the drumstick tree (*Moringa oleifera*) and produce data from their own studies. The leaf of the drumstick tree has long been known to be a rich source of ascorbic acid, providing 900 to 1,100 mg. per cent. of this vitamin. The edible portion of the pod also contains nearly 1% of the vitamin.

The leaf contains in addition 100 to 110 mg. per cent. of β-carotene. In the course of investigations on the processing of drumstick leaf by fractionation and dehydration methods so as to obtain rich concentrates of ascorbic acid and β-carotene, interesting results were obtained in regard to the relative stability, under ordinary conditions of exposure, of ascorbic acid in aqueous extracts when examined during pre-flowering (October-November) and flowering (January-February). Typical data on stability are tabulated for drumstick leaves and flowers being higher than those for lucerne leaves or for pure ascorbic acid.

1105. QUIROS, M. A. 633.854.78
El girasol. Importancia de su cultivo en Costa Rica. (The sunflower. The importance of its cultivation in Costa Rica.)
Bol. tec. Dep. nac. Agric., Costa Rica, 50, 1945, 23 pp.

This bulletin is in two parts, (1) a general account of the sunflower (*Helianthus annuus*) and its cultivation, and (2) a description of experiments carried out with the flower in Costa Rica. The experiments led to the following conclusions. The zones most suitable for the cultivation of the sunflower in Costa Rica are in the region west of the Central Plateau contiguous with the Pacific zone, particularly in the Pacific zone itself. The altitude of plantations should not exceed 1,000 metres, and the average annual temperature should not be less than 20° C. The cost of production, the ease of cultivation and the adaptability of the sunflower to Costa Rican conditions should assure success with further exploitation of this crop.

1106. GREENWAY, P. J. 633.88
Empire production of drugs. IV. *Strophanthus kombe*.
E. Afr. agric. J., 1946, 11: 184-5, bibl. 8.

Several species of *Strophanthus* indigenous to East Africa are discussed, but according to British Pharmaceutical Standards only seeds of *S. kombe* are recognized as official. It is doubtful whether this species will ever be a suitable plant in climatic conditions suitable for Europeans.

1107. RAO, M. R. R., AND SREENIVASAYA, M. 633.88
Asparagine from Indian pulses.
Curr. Sci., 1946, 15: 25-6.

Phaseolus mungo was found to be the richest source of l-asparagine among 4 pulses examined.—Indian Institute of Science, Bangalore.

1108. MUKERJI, B., AND GHOSH, S. K. 633.88
Lobelia nicotianaefolia Heyne as substitute for *Lobelia inflata* Linn., B.P.
Curr. Sci., 1945, 14: 198-9.

It is shown that Indian lobelia, provided it is collected during October and November from suitable areas, yields a better product than the official B.P. or U.S.P. drug. A good sample of the lobeline content was almost four times as high as an authentic official sample of *Lobelia inflata* obtained from New York.

1109. CHILDERS, N. F., AND ROBLES, P. S. 633.88
Bay rum from Puerto Rico.
Agric. Amer., 1945, 5: 132-5.

The United States is supplied with bay rum from Puerto Rico, where the industry is limited to a few scattered growers. The essential oil of the lotion is distilled from the leaves of the bay rum tree, *Pimenta racemosa*, the cultivation of which is described.

1110. WELLMAN, F. L. 633.88
Balsam of Peru from El Salvador.
Agric. Amer., 1945, 5: 86-8.

The tapping of the balsam tree, *Myroxylon balsamum*, is described. It is done by Red Indian balsamers and requires great skill. The product goes by the name of balsam of Peru, because it was first shipped to Spain from that country.

most of the supplies come from El Salvador, where the traditional methods of tapping, collecting and extracting still in practice.

1. DE ARRUDA VEIGA, A. 633.88.11.871: 632.796
O ataque dos cupins. (Termite attacks on eucalyptus.)

Rev. Agric. São Paulo, 1945, 20: 350-1.

ere destruction by termites of young eucalyptus plants escribed. The symptoms are withering of the leaves and mescences at ground level on the stem. The termite stly associated with the damage is briefly described but named. Precautions to be taken at transplanting are tioned.

2. HARPER, R. E., AND WINTERS, H. F. 633.88.51
Cinchona investigations in Puerto Rico.

Agric. Amer., 1946, 6: 30-2, 37.

er several failures to establish *Cinchona* plantings in erto Rico, a location in the Toro Negro National Forest is selected in 1941 for further trials. This area, located an elevation of 3,000-3,500 feet in a valley between two ountain ranges, offers good protection from winter winds. proximately 14,500 seedlings were received from the 3. Plant Introduction Gardens in 1943 and early in 1944. majority were planted in nurseries and were ready for planting in 1945. The raising of the plants from seed in the nursery beds, similar to those used in Java, are ccribed. A soil mixture composed of equal parts of leaf uld and a granitic sandy loam soil or subsoil, providing both fertility and drainage, has so far given the best ults in the nursery. Susceptibility to disease in the ery was found to be closely associated with adverse conditions. One of the root diseases shows symptoms similar to those produced by the *Graphium* stage of a *selliniae* species in Javanese *Cinchona* plantings. A stem ker, which also causes serious losses, exhibits symptoms similar to those caused by *Phytophthora parasitica* in atemala. The most serious insect pests of *Cinchona* in erto Rico are various species of thrips which are named. nsplanting from the nursery to permanent locations on races in the forest is done in the rainy season. The nting method used is described. It is hoped that by cation and breeding of the present collection of strains 1 varieties quinine production in Puerto Rico will be al or even superior to that in Java before the war.

3. STOFFELS, E. H. J. 633.88.51

Le quinqua. (*Cinchona*.)

Publ. Inst. nat. Étude agron. Congo belge, Sér. tech. 24a, 1945, second edition, pp. 57, bibl. 58, 50 fr.

an abstract of the first edition, which was published in 9, see H.A., 9: 1028. In the second edition the general line of the publication has been retained, but the latest orination available has been incorporated and the liography has been brought up to date. The photgraphic illustrations have been partly replaced and their ber has been increased.

4. HACQUART, A. 633.912

Considérations relatives aux plantations serrées d'Hévéa au Congo. (Close planting of rubber in the Belgian Congo.)

Bull. agric. Congo belge (Bruxelles), 1944, 35: 112-7.

lea for the rational use of both seedling and grafted ber, the former to be planted very densely, tapped very erely and eliminated at an early date. Experience at z indicates the advantage to be obtained by planting ed populations of cacao and rubber. It is suggested that the initial planting would be of 500 grafted+1,000 dling Hevea plants per hectare and that this would be lowed by later planting with 1,000 cacao palms in the rth year.

1115. SIERRA, H. M. 633.912
Plantas cauchiferas. El caucho. *Hevea brasiliensis*. (Rubber-producing plants. *Hevea brasiliensis*.)

Rev. agric. Guatemala, 1945, 1: 384-8.

This article is a continuation of a previous one (H.A., 15: 1972) dealing chiefly with *Hevea*, and describes the method of budding. Budsticks should not be less than a metre in length, preferably from 1½ to 2 metres. Each budstick consists of four parts: a terminal weak portion unsuitable for working; a green part which is considered good; next the part which yields the best buds; and the lowest, most woody part which does not bear buds suitable for working. The patch method of cutting out the buds and inserting them in the rootstock is described in detail.

1116. OVALLE V., C. A. 633.912-1.541
Topicos sobre injertacion del *Hevea brasiliensis*. (On budding *Hevea brasiliensis*.)

Rev. Agric. Guatemala, 1945, 1: 389-91.

An illustrated description of budding *Hevea brasiliensis* by a method of patch budding in which the strip of bark of the stock remains attached at its base and, after the bud is inserted, is folded back over the bud. The union is tied round with a strip of bleached cotton impregnated with wax. At the end of 16 days the band is removed and the tongue of bark covering the bud is cut away.

1117. FORD, C. E. 633.912
Ceylon clones—XI (1944-45).

Quart. Circ. Ceylon Rubb. Res. Scheme, 1945,

22: 22-5.

In this report the yields for the tapping year 1944-5 are added to the previous records (see H.A., 15: 1960). A table shows the mean yields of seven selected Ceylon clones in pounds per tree per year from the commencement of tapping to date, and comments are made on the best three.

1118. WHELAN, L. A. 633.912-1.8
Field experiments on Dartonfield estate—XXVI.
Manurial experiment with mature rubber (1944).

Quart. Circ. Ceylon Rubb. Res. Scheme, 1945,

22: 3-4.

The results for 1944 are similar to those of previous years. The manured plots N, NK, and NPK show significant increases over the control, but the smaller response to NP is not significant. Differences between manurial treatments are not significant.

1119. DE SILVA, C. A. 633.912-1.55
Field experiments on Dartonfield—XXVII.
Comparison of tapping systems.

Quart. Circ. Ceylon Rubb. Res. Scheme, 1945,

22: 4-11.

The results of the various tapping systems are set out in tabular form. The dry rubber content figures for 1944-5 are of the same order as those of the previous year and some of the differences are again statistically significant. All the figures are satisfactory, especially those for the double-three in the eighth year of tapping. In all cases the rate of bark renewal can be considered satisfactory. There has been a considerable increase in the number of cases of brown bast for all the tapping systems in 1944-5; most of the cases appeared in the latter half of the tapping year, when weather conditions were exceptionally unfavourable.

1120. SHARP, C. C. T. 633.912-1.55
An intensive tapping experiment.

Quart. Circ. Ceylon Rubb. Res. Scheme, 1945,

22: 11-16.

The experiment described in this paper was started in December 1942 with the object of obtaining early information on the effect of tapping on the intensive systems required under the Capital Compensation Scheme. By this scheme the Imperial Government undertook to subsidize the cost

of replanting certain areas which the owners by way of return undertook to tap to exhaustion within a period of two years on a system of not less than 200% intensity. The four tapping systems compared were:—Double-1 (D1) 2S/2, d/1, 400%; Double-2 (D2) 2S/2, d/2, 200%; Double-3 (D3) 2S/2 d/3, 133%; Double-4 (D4) 2S/2, d/4, 100%. During the second year of the experiment it was found that the double-three plots had yielded 42 lbs per acre more than in the first year. During the first year three of the five tasks were rested for four weeks but no rest was given during the second year. The increase in the second year could mostly be accounted for by the omission of the winter rest and this system was chosen as the control. With the double-1 system very high yields were at first obtained, but the yield fell rapidly and after the fifth month this system yielded very little more than the double-2; this system is too heavy to be profitable for as long as two years, but in the conditions prevailing during the experiment it could be used successfully for 9 to 12 months. For the first six months the double-2 system yielded 136% of the control, after which the yield declined and for the next seven months the yield was only 120%. With double-4 the first effect of reducing the tapping intensity from 133% to 100% was a drop in yield to 76% of the control almost exactly equal to the drop in tapping intensity. From the sixth month onwards the yield increased and remained at about 85% of the control during the second year.

1121. SHARP, C. C. T. 633.912-1.55
A note on upward tapping.
Quart. Circ. Ceylon Rubb. Res. Scheme, 1945, 22: 18-21.

By tapping upwards it was hoped to exploit the bark above the old tapping panels to the fullest extent without the use of ladders, and also, since the latex would in this case be drawn from above the tapping cuts, without interference from the poor bark below. Upward tapping can be used successfully on otherwise worthless trees and for slaughter tapping. It is very doubtful whether it could be used with advantage on trees which it is intended to keep in tapping indefinitely. For general use it is not considered a suitable alternative to downward tapping.

1122. BERTRAND, H. W. R. 633.912-2.19
Treatment of brown bast.
Quart. Circ. Ceylon Rubb. Res. Scheme, 1945, 22: 21-2.

Neither the scraping nor stripping of old trees has proved satisfactory; in many cases the disease has either not been eliminated or excessive damage has been done. The writer tried a less drastic method. The panel was isolated by cutting the usual groove through the hard bast and then with a sharp narrow blade cutting into the wood. The affected area was scraped in the usual way, but not so deeply. It was never allowed to go into the soft bast, though this might be exposed in places. Relatively large, but thin, traces, therefore, of brown bast tissue were left on the tree; these were disinfected the following day with 5% Izal and Swedish Red. The work was done during dry or reasonably dry weather. The method proved to be reasonably economical and effective and as the scraping is not deep the work does not require so much skill and care as the old deeper method.

1123. KOTILA, J. E. 633.912-2.4
Rhizoctonia foliage disease of Hevea brasiliensis.
Phytopathology, 1945, 35: 739-41.

The hevea leaves examined had spots varying from 1 to 10 mm. or more in diameter to blighted areas involving one-half to two-thirds of the leaf blade; the affected areas were commonly surrounded by a narrow brown border. The fungus found on the affected leaves was of the *Rhizoctonia* type. The perfect stage of the fungus occurred as greyish white powdery areas on both sides of the affected leaves. The spore size and other characters of the fungus conform with *Pellicularia filamentosa* (Pat.) Rogers.

1124. ANON. 633.913
La elaboracion del caucho Castilloa o hule silvestre de Costa Rica. (The preparation of the Castilloa caoutchouc or wild rubber of Costa Rica.)
Bol. Tec. Dep. nac. Agric. Costa Rica 40, 1942, 7 pp.

The method of tapping the wild trees of *Castilloa elastica* and the preparation of the product for market are described. A special tapping knife is described and figured.

1125. G., M. 633.913
Observations sur l'exploitation des fumutimias au Cameroun. (Notes on the use of fumutimia for rubber production in the Cameroons.)
Agron. trop., 1946, 1: 60-8, bibl. 7.

Tests both with wild and plantation *Funtumia* in the Cameroons show that it cannot in any way compete with *Hevea* as a source of rubber. If exploited to the full, with resulting death of the tapped trees, it can give and given useful yields in an emergency.

1126. HILL, A. G. G. 633.956
Camphor production in East Africa from Cinnamomum camphora.
E. Afr. agric. J., 1946, 11: 148-56, bibl. 16.

Cinnamomum camphora trees growing in the West Usambara Mountains, Tanganyika, were found to yield sufficient camphor to justify the erection of a factory for emergency production during the war. Production methods described and relevant data are submitted by the Director of the East African Agricultural Research Institute, who has been in charge of the scheme. The prospects for a camphor industry in East Africa depend on its ability to compete in price with the natural product of the Far East and the synthetic product of Europe and America. The industry would have to be established by exploiting short-term tapping on a coppicing system as well as camphor-yielding herbs, such as *Ocimum kilimandscharicum*. The possibility of producing high-yielding forms of the latter by propagation and selection seems worth investigating.

1127. JARVIS, H. 634.441-2.6/7
Pests of the mango.
Qd agric. J., 1946, 62: 10-4.

The life history and habits, and measures for control, are described for mango scale (*Chionaspis dilatata* Gmel.), pink wax scale (*Ceroplastes rubens* Mask.), tip borer (*Bombotelia jacosatrix* Gn) and *Papleria euthysticta* Tu., mango weevil (*Cryptorhynchus mangidrae* Fabr.) and Queensland fruit fly (*Strumeta tryoni* Frogg.).

1128. MITRA, P. 634.421-2.78
The moth *Taragama siva* Lefroy, as a pest of guava tree (*Psidium guava*).
Curr. Sci., 1945, 14: 209.

The caterpillar of *Taragama siva* Lef. (*Lasiocampidae*, *Lepidoptera*), recorded as a pest of babul (*Acacia arabica* Rose), and ber (*Ziziphus jujuba*) has been found by the author to be a pest of guava.

1129. MAGUIRE, E. G. 634.57
The piñon.
Agric. Amer., 1946, 6: 39.

An appreciation of the nutritious piñones, pine nuts produced in large quantities by *Pinus edulis* and three other *Pinus* species in Mexico and elsewhere at altitudes of 5,000 to 8,000 feet. The nuts, which are popular also in the United States, are gathered in winter as soon as the cones are opened by the first frosts.

1130. SCHREIBER, W. R. 634.575
The Brazil nut.
Agric. Amer., 1945, 5: 239.

Exports of Brazil nuts (*Bertholletia excelsa*) from Amazon Basin were second only to rubber until during the war all available labour was diverted to rubber collection.

the nut trees, often 150 feet high or more, are usually found groups, growing on well-drained ground. The fruit is a large pod, containing 12-20 dark brown nuts of irregular shape resembling the segments of an orange. The food value of the nut (oil content of 65-75%) is high and it is suggested that Brazil nut may help to supply the deficiency fats and oils in Europe when the rubber situation eases.

31. LOOMIS, H. F. 634.6(759)

New palms in Florida.

Nat. hort. Mag., 1946, 25: 29-39.

Within the last year or two several palms never before successfully grown in Florida have flowered in the U.S. at Introduction Garden, Coconut Grove, Fla., and one them has produced seed. Four are of economic importance in their native land while the others appear to have had, if any, special uses. Four are described, viz. *Trithrinax villosa*, *Bismarckia nobilis*, *Attalea spectabilis* (the rrua palm), and *Borassus flabellifer* (the Palmyra palm). The first three are illustrated.

32. BOMHARD, M. L. 634.6(81)

Brazil's oil-yielding palms.

Agric. Amer., 1946, 6: 6-9, 14-5.

Principal types, distribution and uses of different oils.

33. THIRUMALACHAR, M. J. 632.651.3: 634.6

Bud rot of areca palms in Mysore.

Nature, 1946, 157: 106-7, bibl. 4.

A preliminary report of investigations into a bud rot of areca palms, which has been rampant in a Mysore village the past 50 years. Affected palms gradually shed their leaves and eventually the entire crown slips out, due to the at the base. The cause of the trouble was found to be a nematode, a species of *Aphelenchus*, resembling in a general way *A. cocophilus*. Until this species is available for comparison, the identity of the present species cannot be fully established. Areca nut seedlings planted in gardens side this particular village have spread the disease to new trees and thus demonstrated its infectious nature.

4. (JAMAICA DEPARTMENT OF AGRICULTURE.) 634.61

Notes on the cultivation of coconuts.

J. Jamaica agric. Soc., 1945, 49: 210-6.

Recent hurricane had caused widespread destruction of coconut palms in Jamaica and the present notes are advice restoring the cultivation of this crop. The chief points are:—Irreparably damaged trees should be felled and their trunks, and those of palms blown down, should be burnt, the crowns of remaining trees treated with $\frac{1}{2}$ lb. blue-ash-lime-salt mixture (1-3-5) per palm. Before starting cultivation on hillsides it would be advisable to lay the banks of fallen palms along the contours as a temporary check to erosion before more permanent soil conservation measures can be instituted. For raising seedlings select from high-yielding trees. Avoid planting coconuts on heavy clay soils or very acid soils. Diagrams and figures given to illustrate optimum spacing, particularly on slopes.

5. KELSEY, J. M. 634.61-2.796

A termite damaging coconut-palms on Suwarro Island: *Calotermes (Neotermes) rainbowi* Hill.

N.Z. J. Sci. Tech., 1945, 27, Sec. B, pp. 69-75, bibl. 3.

Suwarro is a small island in the Danger Group, Pacific Ocean, where the native population largely depends on coconuts for food. Lately, many of the palms were so severely damaged by termites, that they are now being snapped by gales. A description of *Calotermes rainbowi* and *samoanus* is given. It is suggested that the method of controlling termites employed in Ceylon for treating coconuts, though originally developed for treating tea bushes, be followed also in the Danger Group islands. The treatment consists of drilling $\frac{1}{4}$ -in. holes into infested

trunks and blowing $\frac{1}{2}$ - $\frac{1}{16}$ oz. of arsenic dusts in by means of a syringe. As termites hardly ever penetrate the living tissues all scars should be covered with protective coatings for prevention. A sticky material is recommended which will prevent termites from re-entering trees, the infestation of which has already been controlled. This material consists of kauri-gum, resin, castor oil and beeswax in varying proportions, but its suitability under tropical conditions has still to be determined.

1136. ANON. 634.771

Average weight of a bunch of bananas.

Trop. Agriculture Trin., 1945, 22: 231-2.

A table issued by U.S. Tariff Commission, October 1945, shows the average weights of banana bunches from 16 countries of origin imported by the United States in 1943, 1944, and January to July 1945. The largest bunches came from Guatemala, Honduras, Panama and Costa Rica, while the smallest were produced in Cuba, British Honduras and Haiti. In 1945, average weights from different sources ranged from 22.2 lb. to 61.8 lb., the average weight of bunches from all supplying countries being about 50 lb.

1137. GROSZMANN, H. M. 634.774-1.521

Pineapple plant selection, with special reference to the elimination of inferior types.

Qd agric. J., 1945, 61: 203-15.

The use of inferior plants as sources of planting material causes much loss to Queensland pineapple growers. This article explains what is meant by "inferior plants" and describes methods for reducing their numbers in the plantation. Inferior plants are of two classes, (1) plants from normal stock which have developed some defect owing to poor growing conditions; (2) plants from inherently defective strains, and they and their progeny remain inferior regardless of what treatment they receive. Selection to eliminate inferior types will cause a rapid and lasting improvement. While it is necessary to cull out any defective strains, there are three inferior types that deserve particular attention: they are known as collar-of-slips, long Tom, and the dry-fruit strains. These are described and illustrated, with desirable fruits for comparison. In eliminating undesirable types the removal and discarding of slips from such plants before they are matured, or their rejection in any other way, will be fully effective only if the grower takes care not to use the crown, suckers, or butts from such plants. Selection of planting material is best practised on plant crops and preferably on the summer fruit crop, both because this yields the most planting material and because the normal summer fruit and plant type most closely approaches the normal.

1138. SIDERIS, C. P., AND YOUNG, H. Y. 634.774-1.8

Effects of iron on certain nitrogenous fractions of *Ananas comosus* (L.) Merr.

Plant Physiol., 1946, 21: 75-94, bibl. 38, being *Tech. Pap. Pineapple Res. Inst. Univ. Hawaii* 155.

The data obtained in this study of the effects of plus—as against minus—iron cultures in association with those of ammonium- or nitrate-nitrogen on the nitrogenous fractions of the tissues of *Ananas comosus* are presented and discussed in great detail. The results indicate that the primary products of ammonium assimilation were amide and amino nitrogen compounds and suggest that protein synthesis in plants supplied with ammonium nitrogen was via these compounds. In the plants supplied with nitrate, protein synthesis from inorganic nitrogen compounds was apparently different than with ammonium.

1139. CHOWDHURY, S. 634.774-2.4

Wilt of pineapple in Assam.

Curr. Sci., 1946, 15: 82.

A wilt disease causing considerable damage to the pineapple (*Ananas comosus*) in Assam was found, by isolation and inoculation experiments, to be caused by a strain of *Phytophthora parasitica* Dastur. Rotting of the roots is invariably

associated with the foliage symptoms of wilt, and affected plants are usually so lacking in roots that they may be pulled from the ground with little effort.

1140. FENNELL, J. L. 551.566.1: 635.64
A new tomato for the tropics.
Agric. Amer., 1945, 5: 23-4.

The outstanding feature of the new tomato variety *Turrialba*, produced at the Inter-American Institute of Agricultural Sciences, Costa Rica, in an amazingly short time, is that it is suitable for growing under lowland tropical conditions. It is a cross of the temperate high-quality variety Cuban Marglobe and of a cherry-like wild type, a compound-ovary, lace-leaved selection of *Lycopersicum esculentum* var. *cerasiforme*. The fruit averages 3-3½ inches in diameter. It is firm-fleshed and bright red throughout and has a moderately smooth, blemish-free skin. Flavour and appearance are suggestive of Marglobe; resistance to diseases, including *Alternaria solani*, appears to be satisfactory. It is, however, not yet ready for general distribution.

1141. KIKUTA, K., HENDRIX, J. W., AND FRAZIER, W. A. 635.64: 632.8
Pearl Harbor, a tomato variety resistant to spotted wilt in Hawaii.
Circ. Hawaii agric. Exp. Stat. 24, 1945, pp. 4.

Although tomatoes have become the most important of all vegetable crops grown in Hawaii, the industry is seriously hampered in many areas by the prevalence of spotted wilt. The Agricultural Experiment Station has now released a variety, Pearl Harbor, which is resistant to the virus strain occurring in the island. The new variety is a selection from a cross between Bounty and BC-10. It may be of significance to breeding work elsewhere that spotted wilt resistance in Pearl Harbor was shown to be a dominant character. First ripe fruits appear normally 85-95 days after seeding, i.e. 3-5 days later than Bounty. The new variety equals Bounty in productivity, but its fruit is smaller, though of attractive appearance.

1142. ANON. 635.648
Okra or gumbo (*Hibiscus esculentus*). (Okra).
Bol. pop. Dep. nac. Agric. Costa Rica, 67, 1943,
2 pp.

A popular account of okra and its cultivation. Three types are recognized, the large, the dwarf, and "lady's fingers"; these can be distinguished by their colour and size of fruit. The properties and chemical composition of the fruit are briefly mentioned and there is a note on insect pests.

1147. BARCROFT, J. 664.84.037
The storage of food by refrigeration.
Scot. J. Agric., 1946, 25: 183-8.

An undue proportion of the vegetables grown in Britain deteriorates or is entirely wasted before it reaches the consumer. A plea is made for storage by refrigeration after the American model.

1148. ROBERTSON, F. W. 664.8: 632.6/7
The removal of insect pests from stored products by means of behaviour stimuli.
Bull. ent. Res., 1944, 35: 215-7.

An apparatus is described which separates the beetle *Silvanus surinamensis* from infested tea. The method involves the stimulus of light, heat and mechanical activation.

1149. MACARTHUR, M. 664.84.11.037
Apples. Experiments in freezing preservation.
Canad. Fd Packer, 1945, 16: 17-8, being *Contr. Div. Hort. exp. Farms Service* 643.

The method described involves: paring, coring and sectioning; immersion in 0.5% potassium metabisulphite; draining; packing in waxed cartons or wooden buckets; adding sugar or syrup; static freezing at -10° F. Samples are

1143. MAYO, J. K. 635.655
Soya beans in Nigeria.
Trop. Agriculture Trin., 1945, 22: 226-9, bibl. 10.
The value of soya beans in comparison with other crops discussed. The policy of fostering soya bean growing in Nigeria appears justified only under the assumption that protein yield per acre will be equal to or surpass that of other crops and that the beans will be introduced into the diet of the people. Further field trials and dietetic observations are needed.

1144. KADAM, B. S., AND OTHERS. 635.657
Chafa—a new variety of gram for Bombay.
Ind. Fng, 1945, 6: 444-6, 1 plate.

Gram [a chick pea] (*Cicer arietinum* L.) is one of the most important pulses of Bombay, and its genetic improvement was taken up in 1933 at the Cereal Breeding Station, Kundawadi, Niphad. Eventually a variety, given the name of Chafa, was selected for earliness, high yield, and attractive colour of the grains; it has proved very popular with cultivators in the Deccan and Karnataka.

1145. REUCKII, F. 635.657
Questions pertaining to the agricultural technique of gram (*Cicer arietinum*). [Russian]
Social. Sel'sk. Hoz. (Socialist Agriculture), 1945, No. 9, pp. 50-2.

Cicer arietinum has now proved itself to be a reliable leguminous crop in the drought-susceptible districts of southern and south-eastern U.S.S.R. To determine individual methods of cultivation, experiments were made at the Mitrofanovo Experimental Field in the Voronezh Province during 1935-8. A direct causal connexion was found to exist between the time and manner of sowing and the one hand and ripening and yield on the other.

1146. CARTER, W. 634.774-2.752
a The oral secretions of the pineapple mealybug.
J. econ. Ent., 1945, 38: 335-8, bibl. 9, being *Tech. Pap. Pineapple Res. Inst. Hawaii* 159.

b MELVILLE, A. R. 633.73-2.752
Mealybug; green scale, and *Asterolecanium*. Practical recommendations.
Mon. Bull. Coffee Bd Kenya, 1945, 10: 106-7, 109.

c WHITE, D. G. 633.912-1.55
An electrometric method for defining the area of bark affected by tapping *Hevea brasiliensis*.
Plant Physiol., 1946, 21: 102-8, bibl. 14.

STORAGE.

withdrawn after 3 weeks, 6 months and one year, allowed to defrost completely at room temperature.

1150. DUBoIS, C. W., AND COLVIN, D. L. 664.85.25.037: 577.16
Loss of added vitamin C in the storage of frozen peaches.
Fruit Prod. J., 1945, 25: 101-3, bibl. 5.

The addition of 200 mg. ascorbic acid per pound of peach fruit has proved effective in controlling browning of peaches during freezing and subsequent storage and thawing. The authors studied the retention of this added vitamin C under various conditions. Fluctuating temperatures were found to be the most important cause of vitamin loss. When fluctuations between 5° F. and -5° F. 50% of the added ascorbic acid was lost during the storage period of one year, as against a loss of 32% at a relatively constant temperature. Further results indicate that steam peeling has some advantage over lye peeling and that in the case of peeling in hot water neutralization of the lye by dipping the peaches in a citric acid solution is slightly preferable to washing them out with water.—Louisiana Agricultural Experiment Station.

51. VAN HIELE, T. 664.85.711.037
Een rassenproef met frambozen in verband met geschiktheid voor snelvriezen. (A quick-freeze trial of raspberry varieties.)
Meded. Direct. Tuinb., 1946, pp. 150-1.

varieties of raspberry tested for their suitability for quick-freezing were Boskoop Hornet, Geertruida, Lloyd George, Preussen, Radboud and Walfried. The first two proved to be most suitable. The best product for direct use is obtained by adding sugar in the proportion of 5 parts fruit to 1 of sugar, but good results were obtained with parts of fruit to 1 of sugar. A good product can be obtained without adding sugar, but it is then advisable to add sugar on thawing.

52. ROUSSEAU, P. M. 664.63.037
Le stockage des olives par le froid. (Cold storage of olives.)
Fruits Primeurs, 1945, 15: 204-7.
nts on practical ways in which olives might profitably be stored for periods not exceeding 2 months at temperatures between 0° and 5° C. without danger to the quality of the extractable.

53. ANON. 664.85.323
Grapefruit storage experiments.
Citrus News, 1944, 20: 143.
vo treatments tried in grapefruit storage experiments were: waxing alone (intended primarily to obviate shrinkage), and waxing after immersion in a 5% borax solution. The treated fruit showed substantially less waste than the untreated fruit, presumably because the waxing process removes a number of mould spores from the fruit and prevents their making direct contact with the rind. The waxed fruit showed less waste after 11 weeks' storage than the non-boraxed at 5 weeks, and the fruit in the two groups held from 13 to 14 weeks showed a loss of 12.7% at the boraxed treatment at 14 weeks, compared with 7.7% for the non-boraxed fruit at 13 weeks.

54. ZWEED, A. K. 664.84+664.85
Over de groenten- en fruitverwerkende industrie in Nederland. (The vegetable and fruit processing industries in Holland.)
Meded. Inst. Onderz. Verw. Fruit Groenten Wageningen, rks. 1, No. 11, 1943, 9 pp.
is is a general survey of the processing (canning, pickling, juicing, pulping, preserving) of fruit and vegetables in Holland. A plate of 20 sketch maps shows at a glance the distribution of the areas where particular products are prepared. Tables show the number of firms engaged in the work in each province, the weights of the various products produced, the number of firms processing particular products, and the percentages of the fresh products that are processed.

55. HOFFMAN, A. M. 664.8
Photoelectric sorting of foods.
Canad. Fd Packer, 1945, 16: 12: 24-5.
Testing foodstuffs such as beans, peas, corn, peanuts, coffee, onions, etc., by hand is now being replaced by photoelectric sorting. Two types of machines have been designed. The "dark trip" is sensitive to dark or light objects and can be adjusted to discard 10, 25, or 100% peanuts, for example in early stages of discoloration. The bichromatic machine only differentiates between light and dark objects, it is only sensitive to all shades of a colour and can be set to reject a given colour or a number of colours from either end of the spectrum. Thus with lemons it is possible to segregate light greens, dark greens, silvers, light yellows, and dark yellows, all in one handling and without human hands touching the fruit.

56. FOOD GROUP, SOCIETY OF CHEMICAL INDUSTRY. 664.84.047
The storage of dried vegetables.
Chem. Industr., 1944, No. 13, pp. 121.
A brief report of a paper, read at a meeting of the Food Group of the Society of Chemical Industry in March 1944. A low moisture content helped to preserve ascorbic acid and to retain the palatability of dried vegetables in storage. Gas storage seemed to have little effect on the culinary quality of cabbage and potato, although it retarded the loss of ascorbic acid. It was essential for the proper storage of carrot. A table shows the approximate life of good quality dried cabbage, carrots and potatoes stored at 3 different temperatures in air and in nitrogen. Gas storage at 15° C. gave in all cases the best results, extending the storage life to 24 months or more.

57. CRUESS, W. V. 664.84.037
Blanching and cooling for frozen pack.
Fruit Prod. J., 1946, 25: 134-5.
Present blanching methods prior to freezing vegetables, as practised in California, are considered satisfactory. However, loss of nutrients and damage to flavour occurs in subsequent water cooling and fluming. The data obtained with a number of vegetables and Newtown apples indicate that air cooling of the blanched product avoids these disadvantages. In commercial practice air cooling could be easily accomplished by passing the product in a single or shallow layer through a box or tunnel counter current to a blast of air at about 800-1,000 feet per minute air velocity.—University of California.

58. O'NEILL, T. H., CLUNAY, W., AND LESLIE, R. J. 634.1/7-1.564
a Symposium on merchandising and packaging of fruit.
Eighty-second A.R. Nova Scotia Fruitgrs' Ass., 1945, pp. 119-36.

59. ANON. 664.84: 631.588.1
Electronics applied to food processing.
Canad. Fd Packer, 1945, 16: 12: 23.
It is stated that by using high frequency electricity for blanching vegetables in place of flowing steam or boiling water, food chemists at the New York State Agricultural Experiment Station at Geneva, N.Y., reduced the loss of vitamin C in treated raw cabbage from the 30% to 40% occasioned by the usual blanching methods to only 3% by electronic blanching.

60. TUBA, J., HUNTER, G., AND STEELE, H. R. 577.16
On the specificity of dye titration for ascorbic acid.
Canad. J. Res., 1946, 24, Sec. B, pp. 37-45.
It is concluded that the 2,6 dichlorophenolindophenol method of assay of vitamin C is highly specific, but in the case of certain cooked foodstuffs non-vitamin C dye reductants may, without check by other methods, introduce significant errors.

61. JOHNS, B. 577.16: 634/635
The ascorbic acid content of some New Zealand products.
N.Z. J. Sci. Tech., 1945, 27, Sec. A, pp. 188-97, bibl. 2.
A number of New Zealand foods were tested for ascorbic acid using Bessey's photoelectric method modified for the Spekter absorptiometer. The foods tested include tomatoes, tree tomatoes, black currants, red currants, gooseberries, Chinese gooseberries, rose-hip syrup, citrus fruits, and vegetable water, all of which may be valuable sources of ascorbic acid. Hothouse tomatoes contained less ascorbic acid than outdoor tomatoes. Gooseberries and Chinese

PROCESSING AND PLANT PRODUCTS

gooseberries contained between 50 mg. and 64 mg. of ascorbic acid per 100 g. Tree tomatoes contained 26 mg. to 43 mg. per 100 g. In a number of cases the effect of stewing, canning, or making into jam or jelly by a standardized method was studied. In general, these processes destroyed only a small proportion of the ascorbic acid in fruits. [Author's summary.]

1162. STRACHAN, C. C., AND ATKINSON, F. E. 635.64: 577.16

Ascorbic acid content of tomato varieties and its retention in processed products.

Sci. Agric., 1946, 26: 83-94, bibl. 23.

Analyses for ascorbic acid content have been made of 31 varieties and strains of tomatoes grown under identical conditions at the Summerland Experimental Station. Clarks Early and Sugawara were found to have consistently good ascorbic acid values and are satisfactory canning tomatoes in this area. The Signet variety was consistently high in ascorbic acid with a mean value of 29.8 mg. per 100 g. over a 3-year period. It has other good qualities but is rather small. The results of crossing Signet with larger-fruited varieties indicate the practicability of developing varieties combining high ascorbic acid content with superior cultural and canning characteristics. Marked differences were found in average ascorbic acid content of canned tomato juice produced in British Columbia and Eastern Canada, that of the former being the higher. Analyses showed that under good processing conditions the total loss in processing from the raw fruit to the final canned product should not exceed 2 to 3 mg. The great importance of rapidly heating the milled tomatoes to 190° F.-210° F. prior to extraction was demonstrated. The sterilizing temperature and length of cooking had insignificant effect on the ultimate ascorbic acid content of the canned juice. Excessive sterilizing did, however, adversely affect the colour and flavour of the juice. [From authors' summary.]—Fruit and Vegetable Prod. Lab., Dom. exp. Stat. Summerland.

1163. BESSEY, O. A. 577.16: 634.3 + 635.64

Report on ascorbic acid (vitamin C) in citrus fruits and tomatoes.

J. Ass. off. agric. Chem. Wash., 1944, 27: 537-40, bibl. 10.

There is no evidence that dehydroascorbic acid or other reducing substances than ascorbic acid occur in fresh or commercially canned citrus fruits or tomatoes. The indophenol method, as described in detail, will therefore measure the ascorbic acid value of citrus fruits and tomato juice.

1164. ZUBRILLIN, A. A. 577.16

Protein vitamin containing concentrates prepared from green plants. [Russian.]

Proc. Lenin Acad. agric. Sci. U.S.S.R., 1943, No. 3, pp. 43-6.

The author describes a method by which he has prepared from green plants (cultivated and wild) a protein vitamin product that can be used for adding to various culinary preparations to increase their food value.

1165. MURRI, I. 577.16: 581.192

A new method of extracting carotin from raw, green plant material. [Russian.]

Proc. Lenin Acad. agric. Sci. U.S.S.R., 1943, No. 4, pp. 37-8.

The raw material is dried by grinding in the presence of CaO. The Ca(OH)₂ which is thus produced adsorbs chlorophyll and xanthophyll. From the dry powdered mixture carotene is extracted with benzine. The method is applicable to the quantitative estimation of carotene and also for obtaining concentrates and preparations of carotene from green plant material. Details are given of a simplified method of estimating carotene.

1166. BOKUČAVA, M. A., AND POPOV, V. R. 633.72: 581.192

Insoluble form of tea vitamins. [Russian.]

Biohimija (Biochemistry), 1945, 10: 3: 234-42. Georgian, Indian, Chinese, and Japanese teas, in addition to containing tannins which can be extracted by water, contain a tannin which, though soluble in water, when isolated in a pure form, is chemically linked with a protein and so cannot be extracted from the plant tissues either by water, ether alcohol, or acetone. The link can be broken by means of an alkaline solvent, and the quantity of tannin determined. The quantity increases during the curing process, and also as the plant grows older.

1167. SISAKJAN, N. M., AND VASILJEVA, N. A. 577.16: 581.192

Mechanism of stabilisation of ascorbic acid in plant material by sulphurous acid. [Russian.]

Biohimija (Biochemistry), 1945, 10: 2: 117-29.

Sulphurous acid inhibited the oxidizing action of peroxidase, ascorbic acid oxidase, and phenolase in the tissue of cabbages and potatoes. Copper salts restored this action in phenolase.

1168. VLADIMIROV, G. E., AND LAPIN, L. N. 577.16: 581.192

The photometric standardisation of 2,6-dichlorophenol-indophenol solutions. [Russian.]

Biohimija (Biochemistry), 1945, 10: 2: 125-9.

A method of determining the quantity of ascorbic acid in plant tissue is described. Its accuracy is not less than that attained by a titration method with which it was compared.

1169. IZMAILOV, N. A. 577.16

Temperature coefficients of vitamin C destruction. [Russian.]

Biohimija (Biochemistry), 1945, 10: 3: 189-98.

Vitamin extracts, obtained from unripe walnuts by various methods, contained vitamin C and dry matter in various degrees of concentration. The rate of decomposition of vitamin C was observed at 80°, 50°, and 20°. The stability of the vitamin was least in those preparations in which it was most concentrated, and greatest in those which contained the smallest amounts of it. In order to ensure stability, the vitamin preparation must be purified thus reducing the content of dry matter relative to that of vitamin C.

1170. VALSCHEI, O. 663.23

Quadro sintético dos defeitos dos vinhos e seus tratamentos. (The defects of wines and their treatment.)

Rev. Agric., São Paulo, 1945, 20: 359-64.

This is a tabulated list of defects of wines, in five columns showing the nature of the defects, their characteristic causes, and preventive and curative measures.

1171. OPARIN, A., BEZINGER, E., AND BAZYNIA, I. 663.25

Changes of nitrogenous substances in champagne during processing. [Russian.]

Biohimija (Biochemistry), 1945, 10: 4: 311-25.

Most of the nitrogenous compounds which undergo changes affecting the quality of champagne are present in the wine with which the making of champagne begins; the yeast contributes but little to the nitrogenous processes described in the article; but it is the source of the enzymes which enable these processes to take place.

1172. WEIDERHOLD, E., MOORE, E. L., AND ATKINS, C. D. 663.813: 634.323

A note on observations on retarding development of changes in flavor and color of glass-packed grapefruit juice.

Fruit Prod. J., 1945, 25: 104-5, bibl. 2, being

Contr. agric. chem. Res. Div. 172.

The preliminary data presented seem to indicate that

iod of cold storage of 14 days to a month at 32°-40° F. or to bringing the product out into room temperature a beneficial effect on the retention of colour and flavour glass-packed grapefruit juices. Ascorbic acid retention not appear to be related to colour and flavour retention. Florida Citrus Commission Research Fellows, U.S. Products Station, Winter Haven, Florida.

3. BAIER, W. E. 663.813: 634.3
How the citrus industry measures it. V. Juice volume.

Calif. Citrogr., 1945, 30: 342, 356.

A new simplified method for measuring the juice volume of citrus fruits is described.

4. ANON. 663.813: 634.31: 577.16
Vitamin C in orange juice.

Citrus News, 1944, 20: 157.

A test in which pasteurized de-aerated orange juice was stored, some of it in a large bottle half full and some in small bottles full to the top, the results showed that the juice can be kept, after removal from the tin, without significant loss of ascorbic acid if the juice is poured into small bottles sufficient for two or three days' consumption.

5. LAL, G., AND JAIN, N. L. 664.85.337

A preliminary note on the quick sedimentation of lime juice for the manufacture of lime juice cordial.

Ind. J. agric. Sci., 1945, 15: 62.

Methods were tested for the rapid classification of lime juice on a laboratory scale. A tannin-gelatin method (0.085% tannin in combination with 0.001126 to 0.03716% gelatin) gave the most encouraging results, complete classification of freshly extracted juice being obtained in 6 days.

6. EIDT, C. C. 664.8.047
Modern dehydration of foods. Review of drying by use of air.

Canad. Fd Packer, 1944, 15: 9: 23, 25, 27, 29, being *Contr. Div. Hort. Dominion exp. Farms Service* 633, Pt. 1.

This is a review of present knowledge on drying fruit and vegetables, and discusses the reasons for failure in drying fruits, preparation and pre-processing, and dehydration. Enzyme inactivation and control is one of the vital factors in ensuring finished quality; the most satisfactory method is destruction by heat, and control by the use of sulphites in gas packing. Sulphites also fix colour in green products and retain ascorbic acid values. Gas packing in nitrogen and carbon dioxide is necessary for some products of known commercial feasible moisture levels.

7. MACARTHUR, M. 664.8.047
Modern dehydration of foods. Classification of enzymes and factors affecting storage.

Canad. Fd Packer, 1944, 15: 10: 23, 25, 27, being *Contr. Div. Hort. Dominion exp. Farms Service* 633, Pt. 2.

Part II of an article on dehydration (see No. 1176), discusses the action of catalase, oxidases and peroxidases, the use of sulphite. The advantages of dipping vegetables in sulphite solution (usually Na_2SO_3) prior to blanching (a partial pre-cook) are that it reduces the oxidation of ascorbic acid during blanching and drying, retains the light green colour of the vegetable, and reduces the rate of loss of ascorbic acid in storage. Deterioration, which is accelerated in the presence of oxygen, may occur at any storage level so far practical; so to ensure a reasonable life, the general practice is to package in an atmosphere of inert gas, nitrogen or carbon dioxide being usually used.

8. TOSELLO, A. 664.8.047
A desidratação dos alimentos. (The dehydration of foodstuffs.)

Rev. Agric., São Paulo, 1945, 20: 325-49.

This article starts with a discussion of the terms dehydration

and drying as applied to the removal of moisture from vegetables and fruit, and continues with a general review of present knowledge of the diverse types of machines used for the purpose, the preparation of vegetables for drying, and methods of bleaching.

1179. (BIRDSEYE, C., AND RODEN, H. W.) 664.8.047
A new anhydrous food process announced.

Fruit Prod. J., 1945, 25: 116, 125.

At a luncheon given to food experts in New York a new dehydration process was described and the preparation of the products for serving was demonstrated. Almost any vegetable or fruit that is served cooked can be anhydrous in an average of 90 minutes, as compared with 18 hours in the ordinary drying process. It is claimed that anhydrous foods retain the colour, flavour, aroma and texture of the fresh product, because the water extraction method employed is rapid, without overheating. Also, because of this rapid anhydrating action, little time is required to restore the water in the cooking process. Preparation for serving takes 4-10 minutes.

1180. PHAFF, H. J., AND OTHERS. 664.85.22.047
Microbiology of prunes during handling and drying.

Fruit Prod. J., 1946, 25: 140-1, 155.

In a brief survey of the effect of drying methods on the yeast and mould populations of prunes, it has been found that: (1) There are no living yeasts or moulds present on prunes at the end of commercial dehydration. (2) In sun drying, the yeasts present on fresh prunes are not killed, and they may temporarily increase during the process. (3) In grading and plant handling after dehydration prunes are recontaminated. (4) With improved sanitary conditions in the plant, it would be possible to obtain dried prunes relatively free of yeasts and moulds. [From authors' summary.]—Joint Research Project of the Quartermaster General's Office, U.S. Army, and the University of California.

1181. RAO, S. D., AND RANGNEKAR, Y. B. 664.84.047: 577.16
Apparent carotene and vitamin C in dehydrated vegetables.

Curr. Sci., 1945, 14: 245, bibl. 5.

The authors' results, given in two tables, emphasize the need for employing the improved technique for the accurate estimation of carotene and ascorbic acid in dehydrated vegetables.

1182. HARGRAVE, P. D., AND HOGG, N. J. 664.85.22
Prcanning treatment on processed plums as it affects quality and vitamin C content.

Sci. Agric., 1946, 26: 95-8, bibl. 4.

Preprocessing of native plums with boiling water, soda, lye, and salt, reduces ascorbic acid content. This contradicts the widely held belief that such treatments are beneficial. Preprocessing treatments are not recommended, but, if one is to be used, a mild sodium bicarbonate solution is preferable as tending to give a better final product.—Provincial hort. Stat., Brooks, Alberta.

1183. SINGH, S. H., AND MUSAHIB-UD-DIN. 664.85.422.035.5
Preparation of jaman jelly.

Punjab Fruit J., 1945, 9: 136-7.

Jamans [Rose apple or Jambos] (*Eugenia jambos* L.) fruit is available in large quantities almost all over India and can be had at a nominal price during the monsoon season. It is stated that it makes an attractive jelly and a standardized method of preparing the jelly is described.

1184. VALDIVIA, M. A. 634.58
Las variadas aplicaciones del maní. (The various pea-nut products.)

Rev. Agric., Puerto Rico, 1944, 35: 170-3.

The uses of the peanut [*Arachis hypogaea* L.] are discussed

under the following heads:—the peanut plant as forage for domestic animals, and the nuts as food for man; peanut butter, oil, and flour; the shell (mostly for fuel, but sometimes ground for mixing with animal or bird foods).

1185. ROUSSEAU, P. M. 634.63-1.56
La décantation des huiles d'olive. (The decantation of olive oils.)

Fruits Primeurs, 1944, 15: 10-3.

The author after briefly describing manual decantation of olive oil proceeds to describe with rough drawings how it is carried out automatically either by transference from basin to basin or by centrifuging.

1186. DE, S. S., AND SUBRAHMANYAN, V. 635.655: 631.56
Processing of soya bean for the preparation of milk and other food products.

Ind. Fmg, 1946, 7: 17-9.

An improvement on the conventional Chinese method of preparing soybean milk is described. The beans are soaked overnight in water and then suspended in bags to facilitate germination, which is allowed to proceed for about two days. The skins are peeled off and the kernels heated with 4 times the volume of water at about 70° C. to extract the bitter principle and colouring matter. The extract is drained off and the kernels washed and ground to a paste which is mixed with 3 times its volume of water and boiled for half an hour. It is then allowed to stand until the coarse matter settles, leaving the milk above. Other soybean products are briefly referred to.

1187. VARIER, N. S. 633.825-1.56
A note on the essential oil from ginger scrapings.
Curr. Sci., 1945, 14: 322, bibl. 6.

In preparing the best quality ginger the rhizomes are scraped to remove the outer skin. Large quantities of these scrapings accumulate and they are generally wasted. They have been reported to yield an essential oil. The present note shows that this oil resembles ginger oil since it contains camphene, β -phellandrene, and zingiberene, all of which are present in ginger oil. The physical and chemical constants of the oil and other details of the fractions are tabulated.

1188. GHOSE, T. P., AND KRISHNA, S. 635.977.8: 547.458.88
Tamarind seed pectin.
Curr. Sci., 1945, 14: 299-300, bibl. 4.

It has been found that if, instead of using the seed flour as the starting material, pounded seeds (size of a sweet pea) are taken for extraction, most of the proteins and fibres remain with the swollen seeds and the pectinous matter passes into solution, giving a purer material. The aqueous solution of the pure material is dextrorotatory and does not reduce Fehling solution. It has a very low acid number. In its colour reaction with iodine the substance differs considerably from starch. Tamarind seed pectin seems to resemble seed-pectins more than fruit-pectins.

1189. KEHAR, N. D., AND CHANDA, R. 634.441
Mango-seed kernel—a new source of food.
Curr. Sci., 1946, 15: 48.

The authors conclude from their experiments that mango-seed kernel merits a place in the category of food grains and would make available every year about 70 million pounds of digestible protein and 780 million pounds of starch equivalent from a hitherto unutilized source.

1190. SCHOOPS, M. 633.912-1.56
La préparation du caoutchouc en Extrême-Orient. (Rubber extraction in the Far East.)
Bull. agric. Congo belge (Bruxelles), 1944, 35: 6-11.

An illustrated description of the rubber extraction process generally adopted in Indo-China, Malaya and the Netherlands Indies.

1191. PILLAI, A. K. M. 633.913-1.56
Coagulation studies of *Cryptostegia* latex.
Curr. Sci., 1946, 15: 73.

It has been found that soap is an excellent coagulant for *Cryptostegia* [grandiflora] latex and can be used at 0.1% of the pH being adjusted to 7.5 by the addition of any of 2½ lb. of soap coagulates about 100 lb. of rubber. Samples of rubber prepared by this method, after compounding and vulcanizing, were 85% to 90% as good as the hevea rubber.

1192. APPLEZWEIG, N. 633.88.51: 581.192
a *Cinchona* alkaloids prepared by ion exchange.
J. Amer. chem. Soc., 1944, 66: 1990, bibl. 1.

b MANGAT, S. S. 634.3 + 664.85.3
Preserved products and by-products from citrus fruit.
Punjab Fruit J., 1945, 9: 131-2.

c RAMIREZ, J. H. 634.771: 581.192
A method for the quantitative determination of tannin materials in plantain and banana flours, and in their peel meal.
Rev. Agric., Puerto Rico, 1944, 35: 234.

d SAVUR, G. R., AND SREENIVASAN, A. 635.977.8: 631.563.5
Tamarind seed "pectin".

Curr. Sci., 1946, 15: 43-4.
e TUBA, J., AND HUNTER, G. 577.16: 635.937.34
Isolation of ascorbic acid from rose hips.
Canad. J. Res., 1946, 24, Sec. B, pp. 46-50, bibl. 9.
Method described.

f WILLIAMS, J. L. 663.25
The manufacture of "flor" sherry.
J. Dep. Agric. S. Aust., 1943, 46: 267-74, 322-5, bibl. 17.

NOTES ON BOOKS AND REPORTS.

1193. BACHER, T., AND SØRENSEN, F. 635.1/7(489)
Dyrkning af Køkkenurter paa Friiland og under Glas. (Vegetable growing [in Denmark] in the open and under glass.)
E. Wiens Bogforlag, Copenhagen, 1943, pp. 502, 210 illustrations, 6 colour plates, 60 kr.

Although published during the war, this large-sized book is only very slightly inferior in its get-up to its forerunner on plant diseases (see *H.A.*, 13: 419), which appeared in 1940. Clear print, well-arranged photos and a wide margin on every page add pleasure to the confidence that is immediately inspired on turning over the leaves of a handbook written by 33 experts. Figures given in the chapter on statistics indicate that in 1942 about 7,100 hectares were devoted to commercial vegetable growing in Denmark, of

which cabbage accounted for over one-third. In 1939 the vegetable area under glass was 335 hectares. While it is proposed to make any detailed statements on the treatment of individual crops beyond saying that all aspects of vegetable growing appear to be thoroughly dealt with and minor vegetables and herbs are also included, readers will be interested in the data given on Danish research stations. The following State Experiment Stations working on vegetables are named:—(1) Blangstedgaard, near Odense, 62 hectares on good loam soil, part of which is planted in fruit trees, the vegetable trials being manurial. (2) Spæbjer, near Esbjerg: in addition to general vegetable trials, extensive breeding of strawberries, raspberries and other crops is carried out; 21 hectares of a good sandy loam subsoil. (3) Hornum (Himmerland), 33 hec-

a good sandy soil on a sandy subsoil; mostly manurial experiments, which give interesting results in view of the conditions. (4) Greenhouse experiment at Virum, 100 square metres of glass, plus 8 hectares field trials; tomatoes and cucumbers. (5) Plant Pathological Trials at Lyngby: control of vegetable pests and diseases. (6) Agricultural Laboratory at Lyngby, with a branch at Vejle: analysis for vegetable growing. These State research stations collaborate with the country's great horticultural organizations, which are also named, and with the Committee for Experimental Vegetable Growing.

4. BRAY, A. 41.3: 91.7=5

Russian-English scientific-technical dictionary.
International University Press, New York, 1945, pp. 551, \$10.00, or £2 10s.

This dictionary specializes in technical terms used in physics, chemistry and engineering and the technician who has some acquaintance with the Russian language will doubtless find of value. There are few agricultural or horticultural words, however, and the horticulturist will find a good modern dictionary such as those of Segal (see *H.A.*, 12: 1144) or Boyanus far more useful. There is the obvious lack of collaboration with a biologist; thus for the Russian *loob* it is given as the English equivalent without phloem as an alternative; the word for scion appears but not that for stock; *kolhoz* (collective farm) is mentioned but not *soz* (state farm); *čelčevitza* is given as meaning lens or il, but in botany it means lenticel.

5. INTERNATIONAL UNIVERSITY PRESS.

41.3: 91.7=5

English-Russian technical dictionary.
International University Press, New York, 1945, pp. 674, \$10.00, or £2 10s.

This is more comprehensive than is its Russian-English counterpart (see above); it, also, should prove of value to micians with knowledge of Russian, and particularly those Russian readers of papers and books in English. again there is a lack of collaboration with a biologist. my botanical and agricultural terms are absent altogether. lenticel, vascular bundle, phloem, vernalization (even lization), stoma, petal, ovary and other parts of a ver. Radicle is given as a synonym of radical !

6. BRUCE, M. E. 631.875

Common-sense compost making by the quick return method.

Faber & Faber, London, 1946, pp. 84, bibl. 9, 4s. 6d.

This is one of those books which at first sight it is difficult to decide whether to take seriously or to dismiss with a gig as just another buzz from the bee in the bonnet. In it author discusses a method of composting which she has ected under the name of Quick Return Compost. She ms that it is simple, labour-saving, efficient and adaptable ill conditions and every type of garden, allotment or n. The book conforms to type, in that the experiments ed are scarcely of a nature, so far as can be judged from brief descriptions, to satisfy modern research standards. insistence on the use of a herbal activator to bring about rapid disintegration of the vegetable matter in the post heap and to energize the humus will probably gize also the scepticism latent in the scientific reader, only because of the suggestion that similar mineral ents to those supplied by the herbal activation are of less effect when applied to the compost heap in static al form by means of chemical fertilizers, on the nds that the herbal activator works by "radiation" ch the static minerals cannot give.* The herbal activator, ch can be made at home or supplied by Miss Bruce, sists of yarrow, oakbark, chamomile, dandelion, valerian, le and honey reduced to a very fine powder. A list is

Theory based on George Lakhovsky's *The Secret of Life* nemann.

given of the useful minerals, etc., embodied in each. Speculation is unprofitable and to decry Miss Bruce's methods without a test would be unfair. She has a considerable and enthusiastic following, she has perfected her system over ten years and is presumably satisfied, and the method is so easy, rapid and little laborious (for instance no turning is required) that the interested sceptic has no excuse for failing to experiment. The convictions on which Miss Bruce bases her method are elaborated in the final, somewhat mystical, chapter. The practical side of the system, the construction and care of the compost heaps, is fully, though briefly, set out in a series of appendices. Among the claims made for the effect of the compost on plants treated with it are: greatly increased resistance to frost and drought, pests and diseases, and improvement of quality, especially as regards taste, texture and nutritional value. G.St.C.F.

1197. FAULKNER, R. P.

634/635

Simple science for the gardener.

Pitman, London, 1945, pp. 85, 4s. 6d.

At a time when increased food production is once again urgently pressed upon us by our rulers the decision to reprint these articles from *The Gardeners' Chronicle* in book form is timely. Gardening can never be dull or boring, or so we hold, but an understanding even in part of the great causes and principles underlying the changes that bring our plants from seed to maturity will not only add tenfold to the allurement of the art but cannot fail materially to enhance the results produced.

The book is divided into three parts treating respectively of the soil, the plant and the enemies of plants. Chapters 1 and 2, dealing with the foundation of plant growth and the chemistry of the soil, are good examples of the author's gift of condensation with clarity. The remaining chapters on soil are concerned with organic matter, acidity and alkalinity, moisture, aeration and temperature. The opening chapter of Part II is a brief survey of the functions of various parts of the plant, including the seed, and succeeding chapters explain the mysteries of nutrition and growth and sexual and asexual reproduction. The complications of chromosomes are defined and expertly unravelled in two brief pages. The final chapter in the plant section outlines—it can do no more—how plants are botanically classified. In Part III plant pests and diseases are briefly discussed with special reference to the nature and the method of increase of various classes of fungal, bacterial and virus infections. Insect pests, apart from generalities, can in the space available be dealt with only by means of one or two representative examples. This is a book to buy and keep. Students of all ages will be amply repaid. G.St.C.F.

1198. HOWES, F. N.

638.132

Plants and beekeeping.

Faber & Faber, London, 1945, pp. 224, bibl. 30, 12s. 6d.

Dr. Howes, who has had ample opportunity for studying bees as botanist in South Africa, in the Gold Coast and latterly at Kew, earns the gratitude of small- and big-scale beekeepers by this lively, well-illustrated book. Primarily written for the English beekeeper, its contents will be appreciated far further afield. The book is divided into three sections. In the first details are given of nectar and pollen, their sources and use by honeybees, the relation of the honeybee to the pollination of food crops, particularly fruit, of planting for bees and bee gardens, of windbreaks and of honeydew and propolis. The middle section (pp. 52-91) is devoted to the major honey plants in England with notes on how and when they are useful. Those discussed are:—clover, lime, heather, fruit blossom, sainfoin, mustard and charlock, hawthorn, sycamore, blackberry, willow herb, field beans, buckwheat and dandelion. The remainder of the book is devoted to much shorter descriptions of other plants now found in England and visited by the honeybee for nectar or pollen. There is a useful index.

1199. KELLERA, B. A., and LYSENKO, T. A. (Editors).

634.1/8(47)

I. V. Mičurin, 1855-1935. Pomological descriptions. [Russian.]

Selzozgiz, Moscow-Leningrad, 1940, pp. xxxi + 559, 52 col. pl. and 365 other figs., 25 roubles.

This book is presumably the second (though this is not indicated) volume of a series of four dealing with the work of Mičurin. Vol. I has already been noted (see *H.A.*, 10: 1268). In the present volume there is an introductory chapter by Professor Černenko giving a general account of Mičurin and his work. The main portion of the book consists of two parts: I (pp. 5-232), with pomological descriptions of new varieties of fruit plants raised by Mičurin, and II (pp. 235-432), containing articles published originally in various periodicals, and also hitherto unpublished pomological articles and notes. Then follow addenda and other brief pomological notes. Parts I and II are profusely illustrated with usefully designed coloured plates and other figures. Among the coloured plates are large folding ones showing the results of crossings, the fruits from the parent varieties appearing side by side with those of the hybrid. On pp. 444-9 is a list of new varieties of fruit plants raised and propagated by Mičurin; it includes the names of 110 varieties of fruit (apple, pear, plum, cherry, almond, black currant, grape vine, raspberry, blackberry, *Sorbus*, *Aciniadis*, gooseberry, quince) and 10 other plants. Where a variety is a result of crossing, the male and female parents are given.

1200. KESSLER, H. 634.11(494)

Apfelsorten der Schweiz. (Apple varieties of [German speaking] Switzerland.)

Published for Schweizerischer Obstverband, Zug, by the Buchverlag Verbandsdruckerei AG, Bern, 1945, 139 loose leaves, 60 coloured illustrations, S.Fr. 8.

Kessler and his assistant E. Schaer, both of the Wädenswil Institute, are to be congratulated on the production of this eminently practical handbook of Swiss apple varieties. Details are given with regard to 79 varieties on the following points:—synonyms, origin, size of fruit, shape of tree, stem, eye, fruit surface and colour, calyx tube, fruit core, seeds, flesh consistency and flavour, storage properties, special characteristics, commercial properties. As well as the coloured illustrations there are simple line drawings which show the position of the core and seeds in each case. About 12 varieties well known in English orchards are described. The colours are noticeably less bright than those used in the pomology recently reviewed in *H.A.*, 16: 540 on French Swiss fruit varieties. Is it permissible to suggest that this reflects both climate and temperament?

1201. RAMSBOTTOM, J. 612.014.46: 582.8

Poisonous fungi.
King Penguin 23, Penguin Books Ltd., London and New York, 1945, pp. 31 + 16 coloured plates, 2s.

The author in his book on edible fungi (*H.A.*, 14: 1493) made your mouth water, but here he tends rather to make your blood curdle with tales of symptoms of poisoning and of the somewhat alarming remedies such as inducing the sufferer to eat the "whole stomachs of three rabbits chopped up with the brains of seven" recommended by some. The most deadly British species are some of the *Amanita* spp., especially the Death Cap (*A. phalloides*), and *A. verna* and *virosa*, but none of these is so sinister looking as the not quite so dangerous species *Amanita muscaria* or Fly Agaric. *Boletus luridus* and *B. satanas* are indeed formidable enough in appearance, cut or uncut, to frighten off all but the completely starved. Many of us have learned to differentiate to a limited extent, but we have always felt the need of an English book to point out the real "deadlies" and designate them with skull and crossbones. We are grateful to the author for doing this in so interesting a manner and we commend his book without reserve.

1202. RIJKSTUINBOUWVOORLICHTINGSDIENST (compiled by).

634/635(492)

Tuinbouwgids voor 1946. (Horticultural Guide to the Netherlands for 1946.)

The Hague, Holland, 1945, pp. 572, f. 3.

This horticultural guide consists of a diary for 1946 for d notes, and a mass of miscellaneous information valuable for the practical horticulturist. It includes among other items:—The personnel of the Dutch Ministry of Agriculture and, in more detail, that of the horticultural advisory service; legislation and regulations concerning horticulture; horticultural labour; illustrations, from photographs, buildings belonging to the advisory and plant disease services and of certain horticultural operations; maps, graphs and tables, and 6 maps, one of these, as frontispiece, showing the distribution of gardens in Holland and indicating the type of their produce; a list of gardening schools and courses of instruction in horticulture; horticultural meteorology. Special features are short articles by experts on particular subjects, such as cultivation, drainage, manure and manuring (on pp. 248-9 is a chart showing the N and Ca requirements for various horticultural crops); rootstocks, pollination (inter-pollination of varieties shown graphically for plums, apples, cherries and pears on pp. 352-5); pruning, grafting, growth substances and their application in horticulture. There is a long table occupying 100 pp. of horticultural plants and their pests and diseases; it is in 3 columns showing (1) name of disease or pest, (2) symptoms, (3) control measures. This is followed by a "spider's web" diagram to show what spray ingredients are compatible with each other, a general scheme for control measures throughout the year, and an account of the various insecticides and fungicides. The above does not exhaust the matters discussed, but it will serve to indicate the scope of the book and to show that it is an invaluable practical guide to horticulturists and all interested in gardens and garden produce. The only disadvantage of getting so much information into such a small compass that the book can be carried in a pocket, is the small and close print.

1203. SMITH, G. 663.1: 582.8

An introduction to industrial mycology.
Edward Arnold & Co., London, 3rd edition, 1946, pp. xiv + 271, 20s.

The second edition of this book has already been reviewed (*H.A.*, 14: 1434). In this third edition no major features have been changed but several minor alterations and additions have been made. Eleven new illustrations have been added, and brief statements are now included on antibacterial substances and fungi in the soil. The bibliographies have also been brought up to date by the inclusion of several new and valuable references and the book should prove of value both to mycologists and also to others interested in the study of fungi.

1204. TAYLOR, G. M. 635.937.34

Roses: their culture and management.

Collingridge, London, 1945, pp. 152, 8s. 6d.

The author has spent a lifetime among garden roses and there can be little that he does not know of their virtues and their vices, of their origins, habits and requirements. It is pleasing to note that the freely reiterated opinion that roses need a heavy, greasy loam to produce of their best is finally, we hope, finally relegated to the category of an old wife's tale. Roses in fact will grow on sand, chalk or other ground that is not actually poisonous, and any soil with good garden soil available need have no qualms. Indeed position is a far greater factor for success than soil. In the matter of rootstocks the author is persnickety probably with reason. The lack of selection in the variable *canina* seedling stocks commonly used in nurseries is inexcusable, for by a little care in this direction it could be collected each particularly suited to a different soil type and the inherently poor growers and disease performers could be eliminated. The debatable virtues

NOTES ON BOOKS AND REPORTS

ernative stocks such as *rugosa*, *polyantha*, and *manetti* are set aside in favour of *R. froebelii* Christ, a native of India, usually and erroneously known in the trade as *xa*. Actually the true *R. laxa* is a weak-growing form useless for stocks. *R. froebelii* has a large fibrous root stem and comes quite true from seed. It is particularly suited to medium and light soils. The orange rust to which it is prone is, in the author's experience, allergic to garden roses and will not live on them. Roses do very well on their own roots when grown from cuttings, and this method is commended to the amateur wishing to propagate from own plants. That they are not usually so grown is only because nurserymen do not consider it an economic proposition. As regards planting, it is insisted that the correct depth is with the union of stock and scion 3 inches above the ground, and this level must be maintained throughout the life of the plant. Divergence either way will result in deterioration. Manuring, both organic and artificial, often does more harm than good in unskilled hands, the fact that farmyard manure is now largely unobtainable has saved the life of many a good rose. Organic manure especially of fermenting material should be used in a layer no more than 3 inches thick and buried no more than 2 inches below the surface. However, established roses with healthy root systems will certainly need feeding, and directions are given for doing this. Mulching in late summer should on no account be undertaken. The chapters on pruning will repay study for the useful hints they give on very different methods to be employed with the various types of garden roses. The remarks on diseases are the result of much observation and experience. Black spot, for instance, is particularly prevalent on roses with Persian blood in their ancestry. These roses are now known as Pernettes; there are signs that this weakness is gradually being bred out of them. Routine matters of cultivation disposed of, the remaining half of the book is devoted to discussion and lists of various classes of rose and roses for every conceivable purpose and here the author's knowledge will prove of service not only for the advice and warning pervading these chapters but for the attention led to many beautiful roses, seldom seen, because seldom publicized. Among the author's many original pronouncements likely to shock the orthodox is the statement that the venerable and venerated Dean Hole was responsible for the appearance of many fine garden roses through his persistent extolling of the exhibition rose, thus setting a standard which was fully accepted by nurserymen and the general amateur. It was only a passing phase in the history of the rose, yet it proved fatal to many of the charming old bushes with their profusion of flowers and sweet scent, however though the author may be about the exhibition, he is just and spares no trouble in advising how these may be grown and staged in the best manner possible. This pleasant book and an informative book, and the reader does not at once arrange to plant a few more roses will, I think, be rare.

G.S.T.C.F.

5. WHITEHEAD, S. B. 638.13

Honeybees and their management.

Faber & Faber, London, 1946, pp. 153, bibl. 20, 12s. 6d.

many books on beekeeping and related subjects have been published during the last few years that it is not at all easy for the uninitiated to discriminate between those which are likely to be of real value to him and those which are likely to lead or misinform him. We have no hesitation whatever in recommending the present book as belonging to the former class. The beginner will find in it clear and concise instructions on the care and management of his bees, while those advanced in the craft cannot fail to derive enjoyment as well as profit from a study of its pages. It is written in an interesting style and, while all irrelevant matters have been rigidly excluded, an astonishing amount of information of practical value has been included. The book has been

illustrated on a generous scale with photographs, many of which are outstanding for their clarity and which help greatly in making obscure points understandable to the amateur. While it is impossible in a short space to comment in detail on each of the twenty chapters, a special word of praise should be given to the section on bee diseases, rather appropriately entitled "Health in the Hive", in which the symptoms and methods of prevention of the principal bee diseases are concisely described and clearly illustrated. This book will be found of interest and value, not only to the beekeeper, but also to the fruit grower to whom the bee is a valuable ally.

H.M.T.

1206. AALSMER, PROEFTUIN VOOR DE BLOEMENTEELT.

635.9

Jaarsverslag van de Vereeniging de Proeftuin voor de Bloementeelt te Aalsmeer over 1944. (A.R. of the Aalsmeer experiment garden for 1944). pp. 56.

Most of this report is taken up with descriptions, as brief articles, of various trials with ornamental flowering plants. Among these articles are one (pp. 28-36) on the soil conditions affecting the colour of the flowers, and another (pp. 40-8) comparing roses grown in steamed and unsteamed soils.

1207. L'AGRONOMIE TROPICALE. 551.566.1: 63

L'Agronomie Tropicale, 1946, Vol. 1, Nos. 1-2 (Jan. and Fev.), pp. 112, fr. 750 a year, fr. 75 a number.

We welcome this successor to *L'Agronomie Coloniale* which ceased publication in 1939. Its aim will be to give the greatest possible publicity to the work of investigators in the French Tropical possessions. Its first number is most attractively produced and printed and its interesting articles make us look forward with pleasure to subsequent numbers.

1208. AMSTERDAM, PROEFTUIN HOLLANDSCH-UTRECHTSCH VEENDISTRICT. 635.1/7

Jaarsverslag van den Proeftuin Hollandsch-Utrechtsch Veendistrict te Amsterdam over 1943. (A.R. of the experiment garden Holland-Utrecht Marsh District of Amsterdam for 1943). 57 pp.

This is a general account of the administration, finance, experiments and personnel of the station during 1943. Nearly four-fifths of the report (pp. 14-52) are occupied by descriptions of the experiments that are being carried out on the cultivation, diseases and pests of vegetables. There are also notes on trials with whortleberry (*Vaccinium corymbosum*) and the use of electricity for forcing chicory in frames and lettuce in the open.

1209. "DE PROEFTUIN" TE BOSKOOP. 635.9

Verslag de Vereniging "De Proeftuin" te Boskoop, 1943. (Report of the Society "De Proeftuin" [The Trial Garden], Boskoop, for 1943). 134 pp.

This report for the year 1943 deals with the work carried out at the Boskoop Experimental Gardens almost exclusively on ornamental flowering plants and shrubs, and consists of four sections. I. The school garden. II. The experimental garden; (a) tree raising, (b) flower culture, (c) investigations (a series of 16 papers by various members of the staff), (d) soil investigations, (e) crossing experiments. III. The variety garden. IV. Financial report.

1210. "DE PROEFTUIN" TE BOSKOOP. 635.9

Jaarboek uitgegeven door de vereniging "De Proeftuin" te Boskoop, 1944. (Yearbook of the Society "De Proeftuin" [The Trial Garden], Boskoop for 1944). 176 pp.

The annual report of "De Proeftuin" appears now as a Yearbook, but it follows the same lines as the Report for 1943 with the addition of certain communications from other societies. The greater part of the yearbook consists of

NOTES ON BOOKS AND REPORTS

reviews, by various workers, of the work carried out during 1941-4, and of articles bearing on particular experiments.

1211. **BUTTENPOST.** 633.88
Verslag van het Proef- en Verwerkingsbedrijf de teelt van geneeskrachtige aromatische en aanverwante gewassen te Buitenzorg, 1938, 1939, 1941, 1942, 1943. (Reports of the Buitenzorg Station for investigations into the cultivation and processing of medicinal plants.) pp. 7, 11, 12, 8 and 8.

The reports for 1938, 1939 and 1941 to 1943 have been examined. They follow a similar plan with brief notes on the various herbs grown in the experimental gardens and (except for 1938) give a "cultivation plan" of the herbs to be grown on the various plots the following year.

1212. **CANADA.** 633/635(71)
Report of the Minister of Agriculture, Dominion of Canada, for the year ended March 31, 1945, 1945, pp. 212, 50 cents.

The report is so crammed with information that selection of particular items is difficult and apt to be misleading. Among investigations which catch the eye are those devoted to rubber plants, notably milkweed (*Asclepias* spp.) and the Russian dandelion or kok saghyz, effect of DDT on different pests, apple juice fortification.—The Division of Horticulture reports on new early apple varieties, new raspberries, black currants resistant to white pine blister rust, orchard management trials and fruit and vegetable processing with particular emphasis on improvement in quality of dehydrated vegetables, apple storage and packing. A brief note is devoted to hop work since the establishment of the Illustration Station at Fournier, Ontario, in 1937. Reports are also included from Experimental Stations and Farms. Thus Kentville, N.S., reports work on blueberries, framework apple trees, apple rootstocks, apple dehydration. From Fredericton, N.B., come notes on apple breeding and strawberry selection. The station at Morden reports breeding work and selection among tomato, peppers, eggplant, melon, lima bean and peas, selection of raspberries and strawberries, selection of hardy cherries and early and hardy apricots. It has been found most important on the prairies to work apricots on hardy apricot roots and plant them in a well drained place where water will not collect in pools. Selection also continues with apples and roses. From Summerland, B.C., comes news of a new cherry, the Van, which originated there and was introduced in 1944. The skin is very bright and is resistant to splitting and storage rots. Its storage qualities are superior to those of Bing or Lambert. Tests show that Mazzard is superior to Mahaleb as a stock for sweet cherries under Okanagan conditions, and that Mahaleb sometimes shows delayed incompatibility. Attempts are being made to control biennial bearing in apples in the Okanagan Valley by cultural methods, which include pruning, manuring, thinning of fruit and blossom thinning. The chief fruits have been analysed for sugar, acid, tannin, pectin and vitamin C. Apple juice manufacture and concentrated apple products are also being investigated at Summerland. A report is included from the Fruit, Vegetables, Maple Products and Honey Division.

1213. **CAWTHON INSTITUTE.** 634/635(931)
Annual Report of the Cawthon Institute, Nelson, 1944-5, 1945, pp. 31.

Fruit research. Observations have been continued on apple trees previously treated with magnesium-containing compounds, and it has become apparent that the effectiveness of the various compounds used (dolomite, magnesium carbonate, and magnesium sulphate) has not been the same, although the rate of application as magnesium element was identical. Dolomite has consistently given more lasting benefit than magnesium carbonate and more especially than magnesium sulphate. The vitamin C content of various apple varieties was determined, and the following results

were obtained, expressed in milligrams of vitamin C 100 g. of whole fruit: Gravenstein 7, Cox's Orange Pippin 11, Cleopatra 10, Delicious 12, Doughty Sturmer 29. The variety Statesman was outstanding in the vitamin C content of its skin. Jams fortified with rose-hip powder and containing originally 40 to 50 mg. vitamin C per 100 g. of jam lost approximately 16% of the vitamin C content in 3 months but lost very little more after a further 3 months' storage. In apple stock experiments the Double Vigour stock (French Crab Seedling vegetatively propagated) was superior to Northern Spy for the Statesman variety on Annesbrook soil. Jonathan on the more vigorous stock is giving a higher yield than on Northern Spy. With regard to East Malling stocks the yield of Cox's Orange Pippin and Jonathan (trees about 10 years old) is a little higher No. 1 than on Northern Spy, with Nos. 13 and 15 not far behind. *Tomato investigations.* Work has been continued on the treatment of tomato soils (glasshouse and outdoor) with steam and with formalin. The results confirm the great importance of steam sterilization in improving the yield of glasshouse tomatoes. Distinct improvement in yield, but not so great as with steam treatment, followed the use of formalin at the rate of 1 pint of 40% formalin to the square yard of soil. Further work on "cloud" and "hard core" has been carried out.

1214. **CEYLON, RUBBER RESEARCH BOARD.** 633.912
Report of the work of the Rubber Research Board, Ceylon, in 1944, 1945, 1945, pp. 31.

Chemical Dept. A study on the plasticity of rubber derived from a large number of individual trees with a view to selection and breeding is in progress. In tests to find a method of preventing tackiness in crepe rubber it was found possible to arrest the onset of tackiness by sulphur (0.05% to 0.1%) and by phenyl β -naphthylamine (0.1% to 0.2%). *Botanical and Mycological Dept.* An increase in the incidence of brown bast in young budded areas was noted. It was found possible to control bark rot due to *Phytophthora* in the newly tapped bark by various disinfectants. Chemical trials continue. Breeding results in 1944 were again disappointing. The planting trials using stumped budded stumps and field buddings are beginning to show some results. In stock: scion experiments there are after 3 years small but significant differences in growth between scions budded on to different stock families. There is, as yet, no evidence that the seedling families which have shown the best growth as unbudded stumps have also produced the best grown scions. A small-scale experiment is in progress to compare bud grafts derived from buds on high and low sections of the main stem below the first branch with those derived from branch buds. Notes are given on the various tapping experiments. *Soils Dept.* In manorial trials manured plots N, NK and NPK showed significant increase in yield over the control. At the same time girth measurement showed that manure has little effect on growth of 30-year-old rubber. Field experiments on young rubber are now beginning to yield results. There are indications that potash tends to advance and NP and NPK mixture retard wintering, the latter resulting in increased *Oidium*.

1215. **CEYLON, TEA RESEARCH INSTITUTE.** 633.72
Annual Report of the Tea Research Institute of Ceylon for 1944, 1945, being Bull. 26, pp. 66.

The director summarizes briefly the very tightly packed departmental reports, which are full of interest to the specialist. *Mycology.* The problem of eliminating worms from Ceylon tea soils appears to be insuperable. Hence work is now proceeding on tea selection and vegetative propagation in the hope of finding resistant varieties and multiplying them. Comparative figures are given showing the relative susceptibility of many plants used for manuring tea to *Anguillulina pratensis*. Work on phloem necrosis confirms its apparent absence from high "jungle" bushes. The probable implication here is that if attack

of these bushes show little or no evidence of the disease though possibly carriers, continue to thrive and yield normally. *Entomology*. Details are recorded of the life history of *Macrocentrus homoneae*, a parasite of *tortrix*. Work continued on the shot hole borer. A severe defoliation of Albizzias due to mite species occurred in one area. *Culture*. There are strong indications that while small amounts of phosphates, say up to 30 lb. P_2O_5 per acre, appreciably increase tea yield, larger amounts are not so effective and tend to increase the weed problem. *Physiology*. Trials of selected clones show that one factor which is obviously important is the favourable effect of a free-chilling habit in the clone. All the best yielding bushes produced teas of at least average quality. Cover crops and weeds are discussed. *Biochemistry*. In manufacturing two alternatives are available as means of disintegrating leaf cells, namely submission of the leaf to very high pressures or to freezing. The cost of the freezing is considerable and is being investigated. The institute has concentrated on the pressure method, using unwithered leaf. Outlook is very promising and it is hoped to publish details of methods tried in the near future. If successful it could be possible to produce by very simple means excellent liquoring teas, the manufacture of which should take more than 2 hours to complete. Saving in manufacturing costs would be great and the elimination of fire risk would also greatly reduce fire risks.

FRANCE, MINISTÈRE DES COLONIES. 63(44)
Office de la Recherche Scientifique Coloniale.
(Office for Scientific Research in the French Colonies.)

Publ. Ministère des Colonies, Paris, 1945, pp. 23.

Office was set up in Paris in October 1943 by a decree of the Minister for the Colonies. Its functions, for some of the Imperial Agricultural Bureaux served as a model, briefly outlined in this pamphlet. Several of the committees appointed deal with subjects closely related to agriculture such as entomology, phytopathology, etc. Members of the various committees are listed in the index.

GOLD COAST. 633.74(667)
Report of the Department of Agriculture, Gold Coast, for the year 1944-45, 1945, pp. 8, 1s.

chief progress made in the treatment of the swollen disease of cacao is that it is no longer considered necessary to destroy an outer ring of healthy trees around an infected tree in order to stop the spread of the disease, and the infected tree is cut out at the first sign of symptoms and the area is subsequently kept under constant supervision. The new policy may be expected to receive the whole-hearted support of farmers. At Akwadum, an experiment on replanting cacao in a devastated area is being conducted, growth has been progressing rapidly. On the other hand, where old infected trees have been left standing or severe food cropping had exhausted the soil in the interval, the re-establishment of old cacao proved a failure. A number of other crops are described more briefly.

HAWAII AGRICULTURAL EXPERIMENT STATION. 633/635(96.9)

Report of the Hawaii Agricultural Experiment Station for the Biennium ending June 30, 1944, 1945, pp. 115.

Tomato variety designated HES 657 selected by the author from a *Bounty* \times BC 10 Cross has proved over 100% resistant to the tomato spotted wilt virus.

Breeding continues in the search for a tomato resistant to grey leaf spot (*Stemphylium solani*) and there are indications that it may be possible to breed a variety capable of withstanding nematode attack. Early blight and late blight blights were satisfactorily controlled by treatment with bordeaux and with yellow cuprocide. Fairly

successful results followed the application in various ways and amounts of D-D and of chloropicrin to nematode-infested soils. Breeding and cultural trials of papaw are reported. No increase in rooting followed the application of indolebutyric acid to litchi layers. Quick freezing proved an excellent method of preserving litchi fruits. Varietal trials of avocado are aiming at the discovery of kinds which will ripen in May and June. The Macadamia nut is being submitted to selection. At the Kona Branch Station manurial trials on coffee are in progress. Floricultural research is being devoted to orchids. Experiments are reported on the effect of sunlight intensity on the growth of coffee. The plants were grown in water under three intensities of light. Heavy shading resulted in decreased growth and fewer but larger leaves. Unshaded plants had larger trunks and root systems. In the leaves shading resulted in increased total N, a tendency to increased P, Ca and K and decreased dry matter, soluble sugars and starch. Severe K deficiency resulted in increased soluble nitrogen. Severe P deficiency led to abnormal increases in total N and nitrogen fractions in general. The effects of boron-, manganese- and copper-deficiencies on coffee plants are briefly noted. Much work is reported on insect pests of vegetables. Among other pests for the control of which DDT appeared to offer much promise were greenhouse white fly (*Trialeurodes vaporariorum*), the Chinese rose beetle (*Adoretis sinicus*) on green beans, and the melon fly. Ascorbic acid tests were carried out on guava products and on mango and tomato varieties. A list of projects and of the responsible workers is usefully given.

1219. HILLSBOROUGH. 633.52-1.4
Eighteenth Annual Report of the Agricultural Research Institute of Northern Ireland, Hillsborough, 1944-45, 1945, pp. 30.

Work in 1944 included a study of (a) flax varietal resistance to *Polyspora lini*, *Colletotrichum linicola*, *Phoma* sp. and *Melampsora lini*; (b) prevention of *Phoma* sp. and *Botryotis cinerea* on flax; and (c) the use of borax to prevent rust (*Melampsora lini*).

1220. INDIA, IMPERIAL COUNCIL OF AGRICULTURAL RESEARCH. 634/635(54)
Annual Report of the Imperial Council of Agricultural Research for 1944-45, 1945, pp. 45, 3s. 6d.

Fruit culture. The various cultural schemes in progress in different areas continued. In all these schemes, the object has been to determine best varieties, suitable rootstocks, quick and cheaper methods of propagation and suitable cultural methods. Citrus die-back diseases, cytogenetics of mango and banana and San José scale are under investigation in certain areas. Manurial trials on citrus and a study on the collection of yield data from individual trees in uniform orchards were initiated during the year under review.

Vegetables. A scheme for the production of seed of acclimatized European vegetables in Kashmir and Baluchistan has been financed by the Government of India. The production of vegetable seeds in other areas is under consideration. *Oil seeds* occupy an area inferior only to rice and wheat. The Council has been financing schemes, which are enumerated, concerned with the breeding of oil seeds, pests and diseases of oil seeds and the storage of oil seeds. Improved strains of groundnuts, bred in Madras, were distributed to other provinces and states. A study of criteria for the selection of coconut seedlings and other coconut schemes are in progress in Madras and Travancore.

1221. KVITHAMAR RESEARCH STATION (BREMER, A. H., AND OTHERS). 635.1/7(484.3)

Melding fra Statens forsøksgård i grønsakdyrkning Kvithamar i Stjørdal. 22. Arbeidsåret 1941. (Twenty-second Annual Report of the Vegetable Research Station Kvithamar, Norway, for 1941), 1942, pp. 67.

The report deals with the following subjects: I. Variety

trials with root and green vegetables, including different kinds of cucumber, beet, bean, pea, cabbage and others. II. The forcing of onions, kohlrabi and asparagus. III. Seed production. (a) Cucumbers. Two methods are discussed by which young cucumber plants in the field may be protected against cold. (1) A glass pane, 9 in. square, is laid across a hollow on top of the ridge above the seed. The hollow allows the plant to grow to a certain height before it reaches the glass. The latter has a forcing effect and affords protection against night frost (up to -3°C). (2) Conical screens of a specially prepared transparent wax paper, which are described and illustrated in detail, have given even better results when put over transplanted cucumber plants. The increase in cucumber yield obtained by methods (1) and (2) over the controls amounted to 100% and 120% respectively. (b) Seed production in the Trondhjem area. IV. Experimental data on carrot growing.

1222. KVITHAMAR RESEARCH STATION (BREMER, A. H., AND ROLL-HANSEN, J.) 635.1/7(484.3)
Melding fra Statens forsøksgård i grønsakdyrking, Kvithamar i Stjørdal. 23. Arbeidsåret 1942.
 (Twenty-third Annual Report of the Vegetable Research Station Kvithamar, Norway, for 1942.) 1944, pp. 32.

I. Variety trials with cucumbers for pickling, kohlrabi and kale. II. The advantage of sowing in frames or seedbeds and transplanting over sowing in the field and thinning has been shown for several vegetable crops both from the point of view of seed saving and increased yield. Certain kinds of pea are best sown in frames about 1 May and planted out a month later.

1223. KVITHAMAR RESEARCH STATION (BREMER, A. H., AND OTHERS). 635.1/7(484.3)
Melding fra Statens forsøksgård i grønsakdyrking, Kvithamar i Stjørdal. 24. Arbeidsåret 1943. (Twenty-fourth Annual Report of the Vegetable Research Station, Kvithamar, Norway, for 1943), [English Summary of Sect. 1 1½ pp.] 1944, pp. 86, bibl. 24.

Section I. *Day length and vegetable growing.* (1) At the Kvithamar experimental farm [latitude $63^{\circ}1'$] 34 species of plants and varieties have during 1942 and 1943 been grown under conditions of two different lengths of day: (a) Long day—the natural day, which during the period between 25 April and 15 August lasts more than 16 hours, at Johnsmassover $21\frac{1}{2}$ hours, the mean length being 18-19 hours. (b) Short day: The plants were covered up at 6.30 p.m., and uncovered every morning at 7, thus getting a day of $11\frac{1}{2}$ hours.

(2) A table gives particulars as to sowing time, and flowering times with long and short day for the plants which reached the flowering stage during the period of growth.

(3) (a) The following plants have been shown to be long-day plants: Chervil, nettle, common borage, coriander, anise, fennel, early turnip (half-long types of forcing varieties). (b) The following plants are not affected by the two lengths of day: Chive garlic, Welsh onion, caraway, cress, savory, purslane, sugar peas, var. English Savory. (c) The following biennial and perennial plants have not yet flowered after cultivation during the first year of growth: *Cochlearia officinalis*, *Salvia officinalis*, *Taraxacum officinale*, *Inula helenium*, *Angelica archangelica*, *Levisticum officinale*, *Rumex acetosa*, *Artemisia absinthium*.

(4) The following plants have been tested as long-day plants: Radish, dill, onion and Egyptian onion (*A. cepa viviparum* syn. *A. proliferum*) (requiring long day for development of the onion).

(5) Research is being carried on in order to find out whether forced radish, forced turnip and chervil should be given a limited length of day by keeping them covered up in excess of the time necessary in order to protect them against night

frost. In the case of forced radish it is probably of little seeing that the radishes soon become spongy and deform and unfit for food, even if running to seed is avoided, limiting the length of the day. In the case of forced turnip and chervil it is profitable to limit day length for a considerable period. The experiments are being continued. (6) Fennel will develop ample basal sheaths when grown under short day conditions. It is now being inquired whether this plant is fit for forcing and subsequent field cultivation. [From authors' summary.] Sections II-VI deal with the following subjects:—production, greenhouse heating, sugar beet production, parsnip and carrot growing, and pasture in rotation field and vegetable crops.

1224. MACAULAY INSTITUTE. 631.4
Annual Report of the Macaulay Institute for Soil Research 1944-45, pp. 24.

The following points are among the conclusions drawn from an extensive experiment, carried out in continuation of investigations dealing with irregularities in connexion with acidity and liming of potting composts and peat:—(a) Lime materials containing equivalent amounts of calcium carbonate produce similar pH values; (b) the laboratory lime requirement figure is lower than the actual amount of lime necessary to maintain the same pH value in practice throughout the season; (c) under ordinary watering practice, a gradient in pH value may develop in 4 in. pots, the pH at the surface being 0.5 lower than at the bottom; (d) little loss of calcitic lime occurs after initial watering; (e) optimum growth of, at least young, tomato plants takes place in a wider range of pH and lime content than is usually assumed. Trials under market garden conditions confirmed these findings, obtained in small-scale experiments, that young tomato plants and other freely growing plants make more rapid growth in 4 in. glass pots than in ordinary pots. On re-potting into 7 in. pots, however, subsequent growth was faster in earthenware pots. Incidentally, it was found that the common practice of setting transplanted seedlings to the side of the pot had no effect on the rate of growth. A new investigation of the microbiological aspects of composting was begun. The material, consisting of fresh grass cuttings, was kept in 3 ft. \times 3 ft. concrete drain pipes suitable for aerobic or anaerobic decomposition. The internal temperature of the aerobic compost was found to rise to about 65° in less than two days, after which it gradually falls to atmospheric temperature. Observations on changes of the bacterial flora are reported, no evidence having been obtained of marked fungal development at any stage. Further experiments with fortified peat are being held to justify the conclusion that peat, along with the required quantity of artificial manure, may be safely used in place of farmyard manure, at least so far as immediate results concerned. Some further developments of the calcareous layer are method, used in spectrographic investigation, have been discussed in special papers. The equipment in the Lundegardh flame emission method has been simplified.

1225. MAURITIUS. 633/635(698.2)
Annual Report of the Mauritius Department of Agriculture 1944, 1945, pp. 30, 50 cents.

Information on production is followed by reports from various divisions of the Department of Agriculture. Chemical Division reports work on aloe fibre, guaiacum, rubber content and hydrocarbons oil. At the Tottori Research Station research was limited to selection of promising strains and crosses and to fertilizer trials. Partly due to cyclone damage little light was thrown on the effect of treating tobacco seed with colchicine. In Rodrigues attempt to eradicate citrus canker by destruction of trees was abandoned. In future, attention will be concentrated on the selection of resistant varieties.

1226. NATIONAL INSTITUTE OF AGRICULTURAL ENGINEERING. 631.51

Report of the N.I.A.E., Askham Bryan for the year ending August 31st, 1945, pp. 12, 3d.

Little of direct interest to horticulturists, but much of potential interest is very briefly reported, e.g. dung handling and lime distribution, trials of fertilizer placement machines and progress in sugar beet mechanizations.

1227. NEW ZEALAND. 634/635 + 664.84/85(931)

Annual Report of the N.Z. Department of Agriculture for 1944-45, 1945, pp. 24, 9d.

The report of the Horticultural Division appears on pp. 17-22. The year was one of abnormal weather, with high rainfall, minimum sunshine, severe hailstorms and disastrous frosts. In the North Island and Nelson the increased rainfall was, to some extent, a compensation for the lack of sunshine, for growth was phenomenal and fruit reached a good size. Small fruits, in the main, benefited by the extra rainfall. *Pests and diseases.* In some areas black-spot was more prevalent than usual but in others good control was obtained. Brown rot was very severe, and bacterial spot of plum showed a marked increase. Fireblight has reappeared in most districts, particularly in regions with shortage of labour for cutting out carry-over cankers. Spraying for ripe-spot on apples is becoming general. *Viticulture.* The crop of outdoor grapes was very good in all districts; although downy mildew, powdery mildew and black-spot were again prevalent, good control was obtained in vineyards where full spraying schedules were maintained. In most districts the crop of indoor grapes was in good condition and fungus diseases caused very little trouble. The wine industry is improving. *Market gardening.* Commercial vegetable production is mostly confined to the better-class lands; good yields, generally, were obtained of the main basic vegetables during the season. Vegetable dehydration factories are operating at Pukekohe, Hastings, and Christchurch, the last named having been opened during the year. *Experimental work* has been continued, to a limited extent, in conjunction with the Plant Diseases Division in connexion with variety trials and the growing of filberts. Dipping stone-fruits as a protection against brown-rot did not prove very promising. Pre-storage heat treatments of onions were continued at Canterbury. Notes are given on the tobacco, hop, and bee-keeping industries.

1228. QUEENSLAND ACCLIMATISATION SOCIETY.

551.566.1: 634/635

The 79th Report of the Queensland Acclimatisation Society 1944-45, 1945, pp. 8.

Experiments—noted only—concern the cultivation of liquorice, sesame, coriander, dill, hyoscyamus, capsicum, gundelia, black peppermint and ephedra. Many seedling avocados, lemons, macadamias and custard apples are being raised in the nursery.

1229. VOELCKER, O. J. 633.74

Annual Report of the West African Cacao Research Institute, Tafo, 1944-45, (mimeographed), pp. 31.

This first annual report gives an interesting account of how the new West African Cacao Research Institute came into existence and on what lines it is organized. The Institute has its headquarters at the Cacao Research Station at Tafo in the Gold Coast, but its activities extend equally to Nigeria. Co-operation with research stations in the French West African Colonies and in the Belgian Congo has already been initiated. The origin of the scheme makes it clear that research must now be concentrated on those pests and diseases, which immediately threaten the West African cacao industry. Foremost among the latter is the swollen-shoot disease. The first object of the investigation was to

study the existing strains of the virus and to describe their symptoms separately, environmental factors having been eliminated by transmitting virus strains from various districts to plants grown at Tafo. Provisionally, 8 strains have been recognized and their virulence, leaf symptoms (acute, chronic), stem symptoms and latent periods (leaf symptoms; stem swellings) are indicated in a table. Out of a large population of healthy mature trees infected by budding with strain A, 44% of the trees were dead 18 months later and the remainder are expected to die shortly. The virus was found to move from the infected scion to the stock in less than 24 days. Attempts to evolve a staining technique for rapidly diagnosing the presence of strain A have given promising results. Virus strains A, B, C do not seem to be transmissible by seed. The search for resistant or tolerant trees continues. A certain measure of control is being achieved by cutting down infected trees and healthy contact trees.—In their *capsid research* the Entomological division concentrated chiefly on the life history of *Sahlbergella singularis* and *Distantiella theobroma*. Preliminary tests with nicotine sulphate, DDT and other chemicals showed that there should be no difficulty in controlling the capsids either as nymphs or as adults, given adequate water and provided the trees are sufficiently small to be covered easily by the spray. The control of *Sahlbergella*, which attacks mature trees, therefore presents a much bigger problem than that of *Distantiella*, which is mainly confined to young trees. The bud wood of a hybrid of the Trinitario complex S.C.I. showed a certain resistance to capsid damage. In addition, 57 other clones have been selected for testing for capsid resistance. Further studies under way include the observation of a collection of cacao varieties and of other *Theobroma* species introduced from Trinidad and Brazil respectively, the re-establishment of cacao in areas devastated by the swollen-shoot disease, mineral deficiencies and propagation by cuttings.

1230. The following also have been examined:

- a BERNARD, E. *Le climat écologique de la cuvette centrale congolaise. (Climate and ecology of the Central Congo Basin.)* *Publ. Institut National pour l'Étude Agronomique du Congo Belge*, 1945, pp. 240, bibl. 176.
- b A.R. Dominica Dep. Agric. for 1944, 1945, pp. 11.
- c LEEK, PROEFUITEN. *Verslag van den Proeftuin te Leek over 1944 met cultuurplan voor 1945. (Report of the vegetable experiment garden, Leek, for 1944 with descriptions of the 1945 trial plots.)* 15 pp.
- d 15th A.R. Dep. Agric. Mauritius Sugarcane Res. Stat., 1944, 1945, pp. 23, 50 cents.
- e 56th A.R. Neb. agric. Exp. Stat. 1942, 1943, pp. 96.
- f 57th A.R. Neb. agric. Exp. Stat. 1943, 1944, pp. 117.
- g A.R. Northern Rhodesia Dep. Agric., 1944, 1945, pp. 11, 1s.
- h RICHARDSON, B. T. (U.S. DEP. AGRIC.). *Workers in subjects pertaining to agriculture in Land-Grant colleges and experiment stations.* *Misc. Publ. U.S. Dep. Agric.* 556, 1945, pp. 164, 25 cents.
- i STEPHENS, E. (U.S. DEP. AGRIC.). *Directory of organization and field activities of the Department of Agriculture: 1941.* *Misc. Publ. U.S. Dep. Agric.* 431, 1941, pp. 243, 25 cents.

